In The Matter Of:

USA, et al. v.

E.I. du Pont de Nemours and Company

Luis Chu

December 06, 2013

Wilcox & Fetzer, Ltd.

1330 King Street

Wilmington, DE 19801

email: depos@wilfet.com, web: www.wilfet.com

phone: 302-655-0477, fax: 302-655-0497

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IN THE UNITED STATES DISTRICT COURT

MIDDLE DISTRICT OF LOUISIANA

UNITED STATES OF AMERICA, ET AL, JEFFREY M. SIMONEAUX, Realtor,	)	
	)	Civil Action
Plaintiffs,	)	No. 3:12-cv-219
v	)	
E.I. du PONT de NEMOURS AND COMPANY,	)	
Defendant.	)	

Deposition of LUIS CHU taken pursuant to notice at the law offices of Potter, Anderson & Corroon, 1313 North Market Street, 6th Floor, Wilmington, Delaware, beginning at 10:19 a.m. on Friday, December 6, 2013, before Christina M. Vitale, Certified Court Reporter and Notary Public.

WILCOX & FETZER
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1330 King Street - Wilmington, Delaware 19801
(302) 655-0477
www.wilfet.com

APPEARANCES:

JANE H. BARNEY, ESQUIRE
J. H. BARNEY LAW FIRM, LLC
2561 CitiPlace Court, Suite 750-161
Baton Rouge, Louisiana 70808
For the Plaintiffs

MONIQUE M. WEINER, ESQUIRE
KUCHLER POLK SCHELL & RICHESON, LLC
1615 Poydras Street, Suite 1300
New Orleans, Louisiana 70112
For the Defendant

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LUIS CHU,

the deponent herein, having first been duly sworn on oath, was examined and testified as follows:

EXAMINATION

BY MS. BARNEY:

Q. Good morning, Mr. Chu.

A. Good morning.

Q. Could you state your full name and address for the record, please.

A. Home address?

Q. Yes.

A. Luis Chu, 1642 Flint Hill Road, Landenberg, P. A., 19350.

Q. How long have you lived there?

A. Since February of 2004.

Q. Have you ever given a deposition before?
A. No.
Q. Like this?
A. Not at all. Not even like this.
Q. I'll just tell you a little bit about the way it works.
A. Okay.
Q. I'm going to ask you questions and you can answer those questions. The court reporter will write down what we each say. So, one thing we need to watch for is talking over each other. And I'm really bad about that too.
A. Yeah.
Q. You sort of get in a conversation and the other one knows where the other one is going and you kind of start stepping on each other. If we can try to avoid that, it helps the court reporter.
A. Okay.
Q. If you can say yes or no instead of saying mm-hmm --
A. Okay.
Q. -- because even though the court reporter can tell if it's yes or no --

A. Okay is not -- okay.

MS. WEINER: You can say okay as well.

Q. Try to say yes or no and we'll try to remind you if we get off on that. We'll take a break whenever you need one and then we'll have lunch brought in; and, if you need a break, just say you need a break and we can stop for a little while.

A. Okay.

Q. If there is any question that you don't understand, just ask me to repeat it or rephrase it and I will do that.

A. Okay.

Q. If you answer it, then I'll assume you understood the question, but, if you need any clarification, just tell me. I'm assuming you are not on any medication that would affect the way you can process questions and answer them today. Is there anything that is impairing your ability to hear questions and give answers?

A. No. I'm not under any kind of medication. I was waiting for you to finish talking.

Q. Thank you. That's just a standard question we ask.

A. Okay.

Q. Can you tell me I guess we'll start with what you reviewed to prepare for your deposition today? We had a little bit of a conversation off the record where there were two documents that you looked at.

A. Right. I mean, it wasn't so much a preparation for the deposition. I told Monique that I have regular conversations with Percy Bell, he is a good friend of mine, and, so, I was aware that the depositions have been going on for a while. So, when I told him that I've been called to make a deposition he was talking, Oh, yeah, there has been some discussion about gas leaks. And I told him, Yeah, I never been involved in any of the incident investigations, but I recall checking a calculation because it's a form -- you have probably seen it. It's a form for the gas leaks and I want to take a look at it and see when I reviewed that.

Of course, I didn't realize that until yesterday that once I looked at that it

becomes part of a preparation even though in my mind it was not technically review. I just wanted to see the time frame of when I looked at it.

Q. And that's fine. I think Monique is just probably trying to prepare you so you are not caught off guard when I ask you those kind of questions.

A. Yeah, yes, and she did a very good job -- she said, Let's just print it out and have it available because it's a few pages and I said, Sure, but I just forgot to bring it.

Q. I appreciate you are having somebody bring those to us today and we'll get to that maybe after lunch or right before. Other than maybe some conversations -- let me strike that. You didn't really do anything to prepare specifically for the deposition other than look at those documents to the extent that was preparation?

A. Other than spending a couple hours yesterday to go over some of the things that you just mentioned as far as not talking over each other and things like that, no.

Q. That was a meeting between you and Ms. Weiner, right?

A. Yes.

Q. And I think you are representing Mr. Chu?

MS. WEINER: That's correct.

Q. I don't want to ask you anything about what you all talked about because that's privileged. Other than that meeting and looking at those documents is there anything else that you did?

A. No.

Q. No research or legal research or anything like that?

A. No. Again, this is the first time I heard about depositions before. It was the first time I experienced one, but, no, I didn't. I've been traveling so much in the last couple months that I haven't even looked at it.

Q. Thanks for coming in today, by the way, I appreciate you meeting with us. We didn't have to subpoena you and DuPont agreed to make you available, so, I appreciate it. Why don't we start with your educational background. Where did you live when you graduated from high school?

A. I lived in Los Angeles. I went to Santa Monica High School in California. Lived in Los Angeles and went to University of California, Los Angeles, for undergraduate. Then, worked a couple years before going to grad school in Golden, Colorado. School's name, Colorado School of Mines.

Q. How do you spell that, mines, M-I-N-E-S?

A. Yes, mines. Both my degrees are in chemical engineering.

Q. You have a B. S. from the University of California in chemical engineering?

A. Right, and M. S. from Colorado School of Mines. Bachelor's from '81 and Master's in '86.

Q. Where did you work in between undergrad and grad school?

A. Consulting company called Global Geochemistry.

Q. What did you do for them during that time period?

A. I provided designs for analytical instruments. The company was owned by a professor at UCLA where I worked as -- in his lab for maybe three years. So, when I -- before I

graduated he offered me a job.

Q. Sounds like a compliment.

A. Well, actually helped me quite a bit because he is the one to recommended that I look at Colorado School of Mines, which I never heard of, and turned out to be a very good school, location. Still have a lot of good friends.

Q. That's great. So, when you got your chemical engineering degree -- let me go back, I'm sorry, go back to that job at Global.

A. Mm-hmm.

Q. Was there a particular industry that you were designing analytical instruments for?

A. This was primarily for oil and gas industries. Some of the analytical instruments or pretty much all the analytical instruments had to do with exploration of oil and gas. So, locating reservoirs of oil and gas.

Q. Did you have any particular emphasis in undergrad or was that just a general chemical engineering degree?

A. Well, the emphasis is chemical engineering. The overall I'll say it would be engineering. You know, typical bachelor's degree

the first two, two and a half years, almost all engineers take. Then, after that it narrows into specialties, chemical, electrical.

Q. And when you were doing your master's in chemical engineering, is there any breakdown where you kind of focus on particular things or is it still just a general chemical engineering?

A. Well, it's still chemical engineering. For a graduate program usually you pick a project, a thesis, and if I were to narrow it down, I chose experimental. So, running experiments to get data to arrive at the thesis to report as opposed to some of my colleagues had computer simulations that didn't involve no actual lab work; but, the graduate programs typical for engineering is -- especially master's is not to focus on a thesis and take that and be the lifelong specialty.

It's just as somebody put to me it's to show how much you can develop on your own, how much you can be self-motivated as opposed to a bachelor's program, which they teach you how to learn; and, a graduate program is, well, how much can you teach yourself, yes.

Q. Did your thesis have a title, one that we could understand?

A. Well, tell you the truth I don't remember the title exactly, but it had to do with supercritical fluids. To put in perspective it's a study to if you subject gases to high enough pressure and temperature they start behaving more like liquids. So, my thesis was to look at using a gas in the natural state, which is CO2, and apply enough pressure and temperature so it will behave as a liquid and then act as a solvent to do selective extractions from a variety of compounds.

Q. That sounds kind of relevant to your work at DuPont, which we'll get to later, but it sounds in the ballpark anyway.

A. Well, pressures for supercritical fluids are probably three, three orders of magnitude. They're very high pressures. The work that is related to sulfuric acid will work on much lower pressures, but at much higher temperatures, yes.

Q. After you got your master's degree where did you go?

A. Worked for an engineering consulting

company in Irvine, California called Fluor Daniel.

Q. Fluor Daniel?

A. Yes, F-L-U-O-R, and Daniel, yes.

Q. What job did you do for them when you got there?

A. As a process engineer working in evaluations of coal gasification. Essentially taking a solid piece of coal and converting it into a combustible gas that can then be used to power turbines to generate electricity and then the exhaust from the turbines can be used to heat water to generate steam, to drive turbines to generate more electricity.

So, it's -- probably two and a half years I worked in the company this was just primarily I'll call it paper studies where we do engineering and cost estimates of what will it take to take a material like coal, taking it to a gaseous fuel and for utility companies to use it to generate electricity and compare the costs, you know, the costs to just hydroelectric, nuclear, burning natural gas, burning fuel.

Q. How long did you work at Fluor Daniel?

A. I think about two and a half years.
Q. And what prompted you to leave that job?
A. Because it was just paper studies. It was during the time that oil and gas were very cheap. So, it was not cost-effective to convert. Even though it was a very neat technology two and a half years of paper studies at least for engineer like myself is not idea of fun.
Q. Where did you go after that?
A. All right, so, I worked for an environmental company that provided consulting services to refineries in chemical industries.
Q. What was the name of that company?
A. Mittel, M-I-T-T-E-L, H-A-U-S-E-R, it's one word. I don't think they're in business anymore.
Q. About how many employees did they have? Was it a small firm?
A. It was a small firm. They had I think four branches. I was in the Laguna Hills, California branch and we probably had a couple dozen and I think overall the company had 100, I'm not sure.
Q. And what was your job at Mittelhauser?

A. At that time refineries had to comply with TCLP regulations -- toxicity, characteristic, leaching, procedure, I think that's the acronym, it has been a few years -- but essentially the refineries had to comply with certain wastewater standards. For example, benzine is a component that finds its way into refinery wastewater. My job was to try to work with refineries to try to isolate, identify, the sources where the benzine was originating and how to minimize it so that they can comply with the wastewater discharge.

Other projects that I worked on related to hazardous waste handling, particularly from refineries. There are some -- in the regulations there are some listed ways. For example, refineries, if I recall correctly, they're what they are called K listed. K has to do with the regulation subtopic, but the consulting company that I used to work for looked at ways of how to handle those hazardous wastes, whether that be through incineration or through solidification, in such a way that water would not leach contaminants out.

Q. So, you were -- sounds like you were working in the process part of that --

A. Right, right. Pretty much I would say all my jobs that I had had to relate with the process. We had -- for example, Mittelhauser there were other professionals like geologists, hydrogeologists. Half of us I think were chemical engineers.

Q. So, your title was chemical engineer or process engineer at Mittelhauser or were there not really titles?

A. Well, title sometimes doesn't mean -- I'll be like senior engineer and you just had to do with number of years of experience or sometimes the company tell us to have a title on our business card just to project to the customer, okay --

Q. What you are?

A. Right.

Q. Who you are?

A. Right.

Q. So, in the job with Mittelhauser was it your job to work on the process -- process issues to -- well, let me strike that and start over.

Was it your job at all to decide which environmental statute was at issue for a project or was it just your job to look at the process once somebody said, This is what we need to meet environmentally, can you help us do that? If that makes sense.

A. Yeah. No, my role was not to determine whether they were or were not in compliance. My role was already identified even internally by the customer that either they were not going to be in compliance or they were not sure, right? So, I would be asked, for example, one project that I worked for for a client was to do a complete evaluation and sources of wastewater from the whole refinery that makes it way to the wastewater treatment facility.

The purpose of doing that was to, you know, first, to identify that, for example, benzine was making its way to the wastewater facility, but because you can imagine the size of a refinery and so many drains and taps it was trying to go unit by unit in each of the refineries and interview operators, look at the process diagrams, confirm that whether the number

of sources that the operator thought were discharging into the wastewater really were in agreement with P & ID, which is process and instrument diagrams, N is the ampersand.

So, I guess in the second part that you meant which is my role is -- I don't know -- they don't know where the source is coming from so you just have to map it. I mean, it was a big three-month project. I remember the report was probably three inches just to show, you know, area per area, which sources, an estimate of how much material is being discharged. Ultimately, we did find the primary sources and were able to segregate those so that the wastewater facility did not have to put additional treatment facility to address the overall volume of the wastewater.

Q. So, you were sort of figuring out from a process standpoint what chemicals or waste was being generated so that the people who were trying to comply with the statute could know what they were dealing with --

A. Right.

Q. -- and try to address it?

A. Yes. In this case -- my apologies.

Q. No, that's okay.
A. But in this case they originally thought if they didn't identify the sources they had to treat the several thousand gallons per minute of wastewater by identifying where the major two sources are and handling those properly they didn't have to put in additional equipment. They were already in compliance. We put in a test program for them, a test program for that, to be able to verify and sustain that type of low concentration discharge.
Q. Do you recall which refineries you did that work at?
A. I do, but I'm not sure if --
Q. You think it might be confidential, okay. That's fine.
A. I'm not sure.
Q. That's okay, if you don't feel comfortable it's not pertinent enough to our discussion to make you feel like you might be breaching that.
A. I mean, this has been over 20 years ago. I know the refinery, but, again, it's not a customer -- if it's not relevant --

Q. It's not that relevant so I'll leave that one alone.

A. Again, I was proud of that job because sometimes it's not -- when it's needed, you know, we want the company to put in a treatment facility, but it's best if you can segregate it in a very small amount and change their practices and that is better than trying to treat uncontrolled discharge.

Q. That felt good, you were successful in that effort?

A. Yeah, the client was happy too.

Q. It sounds like you just had less water to treat once you identified the source and sort of steered it back --

A. Significantly less.

Q. How long were you with Mittelhauser?

A. I think probably only about a year and a half. It was less than two years.

Q. And what caused you to leave there?

A. Well, I had some friends that I went to school with and they worked at a research facility for Conoco, which is an old company that has since been acquired by Phillips Petroleum.

They knew that I wanted to go into an R&D organization and Conoco was one of the few companies that don't look at graduate degrees. Most R&D organizations, especially oil companies, would not have hired anybody unless they had a Ph.D., but I knew some friends at Conoco that recommended me.

The person who eventually became my supervisor he used to be a professor at Colorado School of Mines. So, he had gotten some recommendations from my other professors, my advisor. So, he actually worked -- it actually worked out okay. In fact, before I took the job at Mittelhauser I was offered a job by Conoco, but I just got married and Conoco R&D was located in Ponca City, Oklahoma. So, it's a city of 20,000 and I wasn't sure I was going to be able to convince my wife to move from Los Angeles to a town of 20,000.

Q. That was probably wise on your part. And you are still married?

A. Well, again, still married. So, the first offer I declined and took the job at Mittelhauser. Then, on second thoughts the costs

of living in Los Angeles are significantly higher than Oklahoma. So, a number of reasons. You asked me why I moved, you know, the job was right, I knew people there. We would not have to depend on two incomes to survive. In Los Angeles two incomes might not be enough.

Q. How long were you at Conoco?

A. Technically at that time Conoco was owned by DuPont. So, I was at Conoco four years. So, as far as -- I forget if you asked me the years of service. I've been with DuPont about 24 years. So, four of those years were with Conoco, but since it was owned by DuPont it's part of my service.

Q. About what years was that?

A. 1990 to '94.

Q. And just sort of generally what did you do in the R&D department at Conoco?

A. There were a number of projects related to the production of oil and gas.

Q. And then what change did you make in 1994?

A. I transferred to DuPont proper. I transferred to DuPont Engineering.

Q. What prompted you to do that?

A. Well, Conoco I was there four years and at that time it's very tough for the oil industry. So, there were three reorganizations in four years. Our division probably lost half, if not more, of the staff in three years and my supervisor -- I said Conoco at that time was a subsidiary wholly-owned by DuPont; but, our e-mail system at the time, which was very basic, we did not have a lot of interaction with DuPont, but my supervisor knew of a job within DuPont that would fit my skills. He was a die-hard Conoco employee, 40-some years, and he was saddened to see a lot of his people being not -- well, terminated in that period of time. So, he suggested to look at a job at DuPont.

I came to Wilmington and I spoke with the group. I liked the group and it turned out to be a good decision.

Q. Good. You are obviously one of the valuable folks at Conoco since no matter how many cuts they did you weren't one of them, right?

A. No, I look at I was probably low enough in the totem pole that carrying me was not enough

to impact the bottom line because there were a lot of good people, but a lot of them took early retirement. They get incentive, years of service, weeks of paid vacation per year. Some of them did really well.

Part of the reason again I left is after you cut enough then you don't have the manpower to do the work that our group is supposed to be doing, so, it was just a matter of time.

Q. Who did you meet with when you came to Wilmington? Do you remember?

A. Yes. He retired, but he is a very good friend of mine, Tony Pezzone.

Q. And he was an engineer?

A. Yes, chemical engineer. He was an engineer supervisor for at that time the nylon intermediates group.

Q. When you started at DuPont proper, what did you start doing at that point?

A. Also as a chemical engineer. Our group, our engineering group, provided technical support for the nylon intermediates division. This is the division that makes components that goes into

making the nylon fiber and makes a variety of products from carpet to engineering products.

Q. How long did you work with the nylon intermediates?

A. Until 2001. It was in two locations, in Wilmington at that time, and then in Houston, Texas. Our group moved to Texas, specifically to Houston, which is halfway to two of duPont's biggest nylon intermediates plants at the time, which were in Sabine, Texas and Victoria, Texas.

Q. What did you start doing for DuPont in 2001?

A. I remained in engineering, but switched over to biobased materials. I moved to Illinois, Decatur, Illinois, where we had a joint development project with a company called Tate & Lyle. It was a pilot plan to try to develop what we called basic data, data that we can use to build a production plant. The project entailed taking genetically modified bacteria, feeding them sugars from corn and have them generate a product called propanediol. So, essentially they ingest the sugars and they create a chemical called propanediol.

So, you can think of it as it's a fermentation process and the chemical then is filtered from the biomass, the water is evaporated, the bi-products are distilled and you end up with a very pure product. Propanediol can be used as a substitute for petroleum-based propanediol. So, it's a biobased product to make a chemical to be used for fibers.

Q. How long did you work in that area with biobased materials?

A. About 2001, to the end of 2003. So, three and a half years.

Q. What did you start doing in 2003?

A. Actually, 2004. That would be like January 2004 I left the DuPont engineering group and start working for one of the DuPont, businesses, which at that time it was called DCSE, DuPont Chemicals Solutions Enterprise. The reason I remember all these dates is because I had to put in -- with my new group I had to put in a biography.

Q. So, you have done it in the recent past?

A. But I had to condense it in a very small paragraph.

Q. You are doing a good job of it. Did you have to relocate to start doing that?

A. Yes, I relocated from Illinois back to the Ivory Tower.

Q. Wilmington? Okay. How long were you in the DCSE group?

A. DCSE changed their names to DC&F, DuPont Chemicals and Floor products. So, even though it's two different divisions, still same group. So, I was there until technically October of last year in 2012. In reality I was -- I transferred all my duties, responsibilities, probably sometime in towards the end of the first quarter of 2012. It was a long transition.

Q. When you were going through that transition, who were you transitioning your duties to?

A. George Brown, who is one of the members of my previous group, ATC, Acid Technology Center.

Q. He was with the Acid Technology Center or you were too?

A. He is still with the Acid Technology Center, yes.

Q. Was that part of the DCSE?

A. Right, DCSE think of it as a big business unit. My group was called Acid Technology Center, yes.

Q. What were your responsibilities in the Acid Technology Center when you started in 2004; and, then, if they changed, you can kind of tell me briefly how they changed.

A. Then, I have to backtrack a little more because I had two -- I worked for two different groups within DCSE. From 2004 until 2006 I was in the research part and I have duties in calculation. Then, towards the last part of that tour of duty I had some responsibilities for sulfuric acid.

Q. Generally what types of calculation work did you do in 2004 to 2006?

A. They were primarily what I call processing relations, which is using a computer program to simulate or to do material and energy balances for calculation plans and part of it for sulfuric acid plants. The purpose were to use that information to roughly size equipment involved in those projects and do a capital

estimate. So, part of it was try to figure out ways to optimize the design to make the plant at lower cost and making it more cost-effective for us to build and operate plants.

Q. When you started working with responsibility for sulfuric acid in 2006, how did your job change at that point?

A. Well, it went from just primarily, again, paper studies, there were some -- at that time we just -- we built the first new acid plant in I don't know how long and this was in Delaware City, Delaware. The plant is called Red Lion. So, the plant had some start-up problems, some technical issues, and my boss volunteered me to go help. So, I went to the new plant, one of thousands, and long story short I start interacting with the plant managers, the operators, and was able to contribute to some of the solutions that they needed.

And I asked for a transfer from, let's say, the R&D part of my group to another group, ATC. My condition was the transfer was to support that plant, which the plant manager accepted and my old boss agreed and my new boss

agreed.

Q. So, you were working under -- let's see, you were working under ATC from 2006 to 2012?

A. Right.

Q. But more in the R&D part?

A. No, no. From 2004 to 2006 it would be more in the R&D part. After that, after 2006, once I became part of ATC, the ATC group is comprised of a number of professionals, mostly chemical engineers. There were a couple chemists or there is still a couple chemists and our role -- the group's role was to provide kind of a centralized resource for all DuPont acid plants where they can go and ask for technical help, maintenance, reliability, turnaround support. So, that's the mission of the group.

The way it was organized is each acid plant had one engineer or a chemist assigned to that plant as the primary contact. Some people in my group had two sites because they just happened to be very similar or they're small enough and, again, even though we were assigned in my case to the Red Lion plant that didn't preclude the plant management from asking

resources from our group or from DuPont in general. So, just to make it easier for each of us to get intimately familiar with the plant so that if there is a question we can be able to address it a lot easier.

Q. Now, was that the 2004 to 2006 role or was that 2006 to later?

A. 2006 into 2012.

Q. You became the person sort of assigned to the Red Lion plant in 2006?

A. Right, until 2010, sometime in the first quarter.

Q. Did they close Red Lion at that point?

A. At that point they -- we idled it, which means you would put it in a state that we felt comfortable restarting it within a year or two. The reason they idled the plant is because the they closed the refinery right next to it and the refinery provided essentially all the utilities to the Red Lion plant.

Q. So, your work from 2006 to 2010 was more hands-on I guess at the plant or more involved with the people at the plant and the operations at the plant than it had been before?

A. Well, let me see how to describe. Let me describe in two parts. The typical role for what we call ATC engineers, my role, is we have members in our group that were very hands-off, meaning they will go to the site once a quarter or only when the plant called them because in general our group, let's say the people supporting the plants, they're located in a different state, okay?

So, it was up to the plant personnel and up to the assigned engineer or chemist to determine how often they visited the plant. So, we had, again, there were people that I knew that only went once a quarter or when needed. There was another engineer that has since retired that visited the plant every other week whether needed or not, just part of it.

In my case when I start supporting Red Lion from 2006, again, to 2010 the plant was located or is located about the same distance from my house to my office and I had a very good working relationship with the two plant managers that were there during my tenure and the operating and maintenance staff and the

operators. So, it became a lot easier for me even to just go to the plant initially and just sit in the conference room, but they later find me a office where I can just go there. If they had any questions, I was there. If I hear anything in the hallway that I could contribute, I participated. It was a very good working relationship that I rather be there than in my office --

Q. Trying to call them and deal with it that way?

A. No, no. In my office let's say in -- my office first was in Chambers Works, it was in New Jersey, and then it was in Barley Mill Plaza. I enjoyed the people that were there and they appreciated having somebody there to help them. At that time sulfuric acid plants started experimenting with having a junior engineer on-site, what we call an ATO, assistant to operations; but, essentially it's a junior engineer fresh out of college and that was another opportunity for me to mentor him and so that eventually he would be the day-to-day engineer to assist the acid plants.

The acid plants traditionally had been you burn sulfur to make S02, to make S03, to make sulfuric acid, they're fairly simple. Red Lion is a spent acid regeneration plant. We sometimes call it SAR. So, there is a little more complexity to it and it is valuable to have technical resource on-site.

Q. During that time was Elizabeth Cromwell working at Red Lion do you recall?

A. She worked towards I think the end of 2009. During that time that was where the refinery was having a lot of problems. They were having -- when we get feed from them, so, it was apparently the end of 2009 that either the refinery production would be curtailed severely and they there were already rumors for sale. So, Elizabeth came towards the end of the Red Lion operation before it was idle.

And, again, I don't remember exactly the dates, but I think when she came within months they announced the closure of the refinery and we were scrambling trying to figure out whether Red Lion can put utilities in place, how much it would cost, what it would take to make

Red Lion stand alone, which was not cost-effective, and then scrambling trying to mothball the plant so that it would be preserved given number of years so that we can restart it.

Q. Has that happened yet, the restarting of Red Lion?

A. Yes, it was restarted in 2011. I think it was a year, less than a year, yes. So, she was there for the later part and then when it was idle and then she was reassigned back to Burnside.

Q. When did the plant go idle? Was it 2009?

A. No. It went idle somewhere the first quarter of 2010. Part of the reason I look for some of the files was to try to remember dates because I knew it was in 2010, but, again, because there was an overlap too. At that time we knew we were going to idle the plant at Red Lion. The ATC engineer that was supporting Burnside for a number of years had retired in 2009 and they had an interim engineer assigned to Burnside.

So, during all that time between making preparations to idle Red Lion my

supervisor already talked to me about, okay, what would be my next assignment, you know. So, at that time I had two choices, either support Burnside plant or support Morses Mill, which is another acid plant we own in New Jersey.

Q. The New Jersey plant is called Morses --

A. Morses, M-I-L-L, M-O-R-S-E-S.

Q. Who was your boss that gave you that choice?

A. Kelli Kober, K-E-L-L-I, K-O-B, as in boy, E-R.

Q. And, so, I take it you chose to support Burnside?

A. Yes, primarily because Morses Mill was very similar in configuration as Red Lion and the truth of the matter is that I probably should have left Red Lion after a year because I already knew enough of the plant, but I liked the people so much that I --

Q. You stuck around?

A. I stuck around. So, after they idled the plant and the plant manager reassigned to another plant essentially there were only four or five people, four or five operators, that I had known

since the plant was started up that were left guarding the plant, waiting for it to restart.

So, Morses Mill was very similar to the Red Lion configuration, but Burnside had a totally different configuration, which make it attractive for me to learn something new. Also, they had the technical need, they needed some help because the plant in 2009 -- this is Burnside -- in 2009 was transformed from what we call a single absorption plant into a dual absorption plant. Red Lion is a dual absorption plant. So, I was able to use part of my experience at Red Lion and apply it to Burnside. That's the type of discussion that I had with my supervisor that prompted me to choose Burnside.

Q. Did Red Lion have some of the same type of equipment that Burnside ended up putting in when it went to the dual absorption?

A. Yes, some of the same type of equipment. Essentially when you go from a single absorption to a dual absorption you add another absorption tower. So, there are -- and you add, you know, a couple more gas to gas heat exchangers.

Q. So, at Burnside when it went to a double

absorption design, that's when it added the HIP and the CIP?

A. Yes.

Q. But the converter had been there a while, is that right?

A. Right, the converter remained the same, but the way they're connected, what we call configured, is changed.

Q. When you were at Red Lion, did you encounter some problems with the CIP and the HIP type of equipment they had?

A. With the CIP, but I need to clarify that even though the nomenclature calling it -- essentially it's a gas to gas heat exchanger, we are trying to recover heat from the hot gas and impart it to the cold gas. So, the function is the same, but the design is different. At Red Lion the CIP is what we call a shell and tube heat exchanger and it is made of carbon steel construction, which is the more conventional type of design for that kind of service.

The CIP at Burnside is a Monplx design, M-O-N-P-L-X. It's registered or trademarked, we should know, we own them now, but

it's stainless steel plate heat exchanger. They both function, service, as a gas to gas heat exchanger, but the design and material construction are different.

Q. Is that just the CIP or the HIP and the CIP that have those different --

A. The HIP on both plants are same type, they're Monplx. Red Lion when we compare the CIP, Red Lion is shell and tube and Burnside is Monplx, but both plants have Monplx type heat exchangers for servicing as a HIP.

Q. So, did you encounter any problems at Red Lion with the CIP there?

A. Yes. Coal -- sorry, sometimes I -- CIP is an acronym that is primarily used at Burnside.

Q. Oh, okay. It's a cold interpass exchanger?

A. I call it cold IP heat exchanger because that's when I started at Red Lion. Sometimes I'll use both interchangeably, but the CIP at Red Lion or any kind of cold IP heat exchanger is susceptible to corrosion. It's just the nature of the process. So, for the case at Red Lion we had -- we had, let's say, two type of problems.

Usually there is fouling because sulfates form internally and that tends to increase the pressure drop in an IP heat exchanger and ultimately sometimes leads to internal or external corrosion and leaks.

In the case of Red Lion we had internal leaks and when that happens there is a bypass of gas around the converter so that it leads to higher emissions, S02 emissions, out of the stack. So, I recall probably in -- sorry, I don't know exact date, but it may be closer to 2008 where we were noticing that stack emissions at Red Lion were progressing a little higher than we had normally encountered. We were still in compliance, but it was just, you know, unusual.

Q. Going in the wrong direction with --

A. Well, not only going the wrong direction, but part of my role was to look at the overall process of the plant and I monitor the plant and the plant goes through various type of feedstock distributions, production rates. So, I look for correlation that said, okay, if the plant is operating this way this is what I expect the converter will perform, which is a direct

relationship to the S02 emissions and I was noting something unusual.

So, we did a number of tests and I came to the conclusion that there was an internal leak. You know, again, there are tubes inside a shell, so, there was leaking internally very slowly. The next scheduled shutdown, which was a couple months later, I convinced the operations manager to schedule an internal inspection and sure enough we found about ten tubes that were leaking and there are probably several hundred tubes. So, we plugged those, restarted, and the nice thing about it is we did not wait until we had emissions problems before taking unscheduled shutdown to figure out the problem.

You know, I felt good about it that we out of looking at trends we identified potential problem , run some tests to at least -- if not confirm, at least give a high probability that there was a leak and, surprisingly enough, convincing the operations manager to schedule a leak check because that takes resources. In a turnaround you only have limited time to do a lot of work. We try to do the complete turnaround

usually in two weeks, but I felt good that he trust me enough to spend the resources and it paid off.

Q. So, he was happy too, I guess, to get it addressed early?

A. I think we were all happy. Within DuPont and the old assignment that I had it was probably one of my best assignments. That's why I stuck around longer than I needed or had to.

Q. You were mentioning two types of problems that any cold IP exchanger can have and one was the fouling because of the sulfates occurring internally, which can cause internal leaks or external leaks.

A. Right, right.

Q. And then what is the second type of problem?

A. Oh, well, the fouling is a problem because it's kind of restricts the gas flow because the pressure drops which makes the compressor in the plant work harder, which requires more -- so, that's the first problem, which leads to the second problem because the sulfates eventually become corrosive and that

leads to corrosion and the leaks. That's what I meant.

And because the cold IP heat exchanger, the CIP, handles a more extreme temperature of hot gas -- well, it doesn't handle the hottest gas, but the difference in temperature between the hot and the cold gas is the highest. That tends to stress the equipment. So, usually it's a normal problem in acid plants to have leaks and having to address them on a regular basis.

Q. And even though the CIP, the cold interpass exchanger, at Burnside was made of stainless steel did it still have the same concerns or issues?

A. Yes. In acid plants or any place internal you cannot stop corrosion. There is nothing that will stop corrosion. There are, but it's too expensive. Essentially you try to control, we try to control the corrosion, try to depict the corrosion rate so that we can forecast when we need to replace equipment.

Q. All right. So, you eventually get assigned as the engineer for Burnside --

A. Mm-hmm.
Q. -- which that must have started around the end of the first quarter 2010, does that sound right?
A. Yes.
THE WITNESS: Can I stop a minute? My wife sent me a text message so I just want to make sure.
(Brief recess.)
EXAMINATION
BY MS. BARNEY:
Q. When you switched over to being assigned to Burnside, did you sort of envision the same role that you had had at Red Lion that you would have at Burnside?
A. You mean roles and responsibilities or same working environment?
Q. Roles and responsibilities.
A. Yes, the roles and responsibilities I expected it to be the same. Again, and I should say, that the roles and responsibilities are not written in stone.
Q. Right.
A. Okay? I found out -- I mean, at DuPont,

I don't know how many groups, and the only time the roles and responsibilities comes into play as a written document is when you interview for the job to explain to the new candidate or when they do performance reviews or whatever. The way my experience of roles and responsibilities in assignments within DuPont or the companies is between, let's say, myself and the person I work for. Sometimes not even my supervisor.

For example, at Red Lion I had asked -- my supervisor I had very little interaction with, okay? So, I look at the plant manager as to giving me direction as to how I want to help them. And he told me, he said, You are doing fine, just keep doing whatever you think is needed and I'll tell you when I need you to do something else. I had a lot of freedom at Red Lion to decide what I needed to do and how I could help the plant.

Q. So, the roles and responsibilities, I take it, sort of were affected by the working relationship?

A. It is. I mean, I was on very good terms with the plant management. So, I kid them, I

said they sometimes treated me as a junior engineer. They asked me stuff that they should be asking the ATO engineer, but it was in good -- I said, Whatever you need to ask. I even shoveled snow at the plant one time when we have I think 30 inches of snow and just kind of stress out the plant. Acid plants don't like cold weather.

So, my roles and responsibilities the way I view it, the way that have worked well for me, is based on a mutual understanding, not anything written that I needed to do. So, I looked at the roles -- a primary goal for my support of the acid plant is how can I help them to achieve production goals, operate within their constraints, you know, limitations with equipment, try to address business needs and for the most part Red Lion through the two plant management changes involved me very much in those type of tasks, even things that are not, let's say, technically my responsibility.

For example, Red Lion had some -- initially some air permit problems because we as a company underestimate the emissions and I was

able to help identify what the errors were in our original calculations. There was nothing wrong with the design of equipment, it wasn't purposely trying to increase emissions because we wanted to increase production. I was able to provide on a technical basis where we made a mistake in the calculations and provide a process basis how we can limit the emissions while trying to maintain close to production rates that the plant was designed for.

Q. At Red Lion the plant management really sort of embraced you as part of the team to solve a problem?

A. Right, right.

Q. That was not really the case as much at Burnside, is that right?

A. No. Again, maybe because Red Lion was highly unusual. I mean, even the plant manager at Red Lion at the time was John Jeffries and he was plant manager at another DuPont acid plant. So, initially he was surprised how much time I would spend at the plant and how much I interacted with them. So, I look at it and the thing you mentioned earlier it's a mutual

understanding, respect and appreciation. You know, I liked the work environment. They found that I can be useful. It worked out pretty well.

So, I mean, even, again, John Jeffries told me the interaction that the ATC engineer with the plant was highly unusual from his experience with the ATC engineer that was assigned to his previous plant. So, I didn't really expect to be embraced at Burnside the way I was at Red Lion, but, again, the working relationship was totally different.

Q. And, so, how did that impact the day-to-day doing of your job?

A. Well, the day-to-day didn't really impact it too much. I looked for things that I thought needed to be done. I had a good working relationship with Percy Bell. I met Percy probably in 2006 or '07 when I visited Burnside. At that time there was another ATC engineer and I went there to give him a hand and I met Percy. So, immediately Percy and I became friends. We are still friends. We talk on a regular basis weekly and, you know, although he has not met my family, I met his family.

So, working relationship, I mean, the day-to-day stuff and I tried to go there maybe one week out of the month, you know, just trying to get everything done within five days so that I limit my travel because I was in Wilmington. So, I just pick and choose based on what I saw the plant needed because I do have access or I did have access to the DCS historian.

Q. And that's on the computer?

A. Right. I can see operating parameters that are recorded and I can also see the operators' control screens. So, I can generally -- you know, even though it doesn't give a complete picture of how the plant is operating it gives me a very good picture of how the plant operates, look at trends, production rates, emission rates, utilities consumption. So, I pretty much was pick and choose whatever was needed.

During my tenure at Burnside there was a turn round, so, I did spend the whole month except for two days, I think. I spent the whole month of April 2011 I think, yeah. So, with day-to-day I usually interacted with Percy and

the operators.

Q. And Percy was the day operator, right?

A. Well, I don't remember what his exact title is. I look at him as a lead operator. He has -- not only he has the most experience in operations of the plant I think he has -- he fully understands the plant. I had told Percy one time that under different circumstances he would have been a very good engineer. In some respects he is a better engineer than some engineers I know of, but he just lacks -- he didn't have a piece of paper. I never ask him why he didn't pursue an engineering degree.

But in terms of who I rely on at Burnside to give me information, again, the DCS, what I can see in the computer in the trends, it's like just a snapshot. You can't not fully understand what is going on at plant, what is causing it, without talking to somebody who is at the plant.

Q. You didn't have any problems with Percy embracing your assistance and working with you?

A. Yeah, I think we embraced too much. We would go out to lunch and I would take him out to

dinner and I met his family. I'm sure you have met him. He is a very personable guy.

Q. Yes.

A. He is a fine person. Most of the discussions we have now that I don't support Burnside relate to his family, my family. I told Monique that I called him a couple days ago to check on him because he had like a stomach virus and it was unusual for him, he took sick days I think two or three days in a row.

Q. And he has been there since -- 30 something years I guess?

A. I'm not sure if it's 34 or 33. It's more than 30 because there were other operators that had 30-some years that have since left. But, again, a lot of operators know how to operate the plant, they know how to push buttons, turns valves and all that, but Percy has a very good understanding of the process. So, he can anticipate if he makes a change --

Q. What is going to happen?

A. -- what are the consequences as opposed to waiting for the consequences to happen. I would like to say that he actually makes my job

enjoyable and that's good.

Q. That is good. So, Percy, you would say is the most knowledgeable in the process, but is he the person who can make the decisions about when to shut down or how to schedule an inspection?

A. No. I'll say technically anybody at the plant, technically, has the responsibility or power to shut down the plant if he or she thinks it's warranted.

Q. And that's the sort of emergency shutdown, push a button, basically?

A. Well, that's one way to shut down the plant, okay? But what I'm saying is at DuPont we like to say that if you think -- if you don't think something is safe, we are told that you have the authority to stop the job and I include the plant, to stop the job, if you don't think it's right, whether it's safety, even ethical, anything that you -- you personally don't feel safe you can shut it down. Now, whether or not that's implemented in practice is based on the individual, right?

But, as far as what authority Percy

has or responsibilities I still -- even after the two plus years I was there I'm not sure what his responsibilities are because sometimes he takes responsibilities that are not -- I think they go to him because people know he knows. So, he takes on himself more than, let's say, his roles and responsibilities that are called for. I don't know if that answers your question.

Q. Yes. And if he thought that there should be a shutdown, let's say, to address leaks on the CIP, the HIP or the converter he would need the support of his plant manager to actually make that happen?

A. Right, unless -- to me an emergency, for example, although it has never happened, you know, if a duct ruptures or if an acid pipe breaks, that is a real emergency that, you know, operators should feel the need to shut down the plant immediately. They don't have to check for it. If it's not imminent danger, say you are addressing if you see a leak, a gas leak, it depends on the magnitude of the leak, right? If the leak is a result of a duct rupture, which is tremendous, but, if a leak due to corrosion, it's

incumbent on Percy, the operators, to alert whether it's the operations manager or the maintenance manager that there is a problem.

And it's incumbent upon the maintenance supervisor if they're not on-site to either try to ascertain them on the phone or go to the plant to determine whether it needs to be shut down or not, but not every leak that an operator or Percy in particular would see, again, would they go and shut down the plant. To me even emergency shutdown, pushing a button to shut down the plant, that also requires a criteria. If you need to shut down the plant, you see if you can do a controlled shutdown as opposed to pressing a button, which would just shut the equipment and trap the gases.

An analogy in emergency you try to apply car brakes to stop the car, but, if the car brakes don't work, then you try to use the parking brake; but, you don't use the parking brake to try to stop the car every time just because it's convenient.

Q. Right. I was asking, I guess, more along the lines if Percy felt like there were leaks in

the equipment, in the CIP, the HIP, the converter, that required repairs during a cold shutdown and he would need the plant manager or others above him to support the decision to go into a cold shutdown to do the repairs?

A. Yeah, actually, the role I see for the plant operators, again, not just Percy in particular, is if there are leaks, if there are problems with equipment, is to alert their supervision. Again, that would be operations, not even the plant manager directly. The chain of command is the immediate supervisor. For Percy it would be Elizabeth. For the maintenance folks it would be Gene Clemons.

It's up to them to decide the, you know, not only by themselves, they can draw resources. You know, within ATC we have also consultants, internal consultants, that specializes in materials construction, refractory, with rotating equipment that the plant can draw upon and say we are having this problem; or, even if it's an obvious leak, we have experts within the company say this is how you can repair it.

So, again, the role of the operators and maintenance folks they cannot -- even myself I cannot -- even if I see the leak I don't know the best way to repair it. I know it needs to be repaired, but that's why it's incumbent upon management to draw the proper resources based on their experience, based on operating practice for an acid plant, who to bring and the procedures. Some of them we have standard procedures how to repair.

MS. BARNEY: I think it's the ETA time for your wife.

THE WITNESS: Thank you.

(Brief recess.)

THE WITNESS: Normally I will have like spread sheets for calculations and this just happened to be the last type of calculation I had done for gas leaks. I mean, I don't know the calculations for Red Lion and some of the calculations don't pertain even specifically to actual leaks. We run a hazards analysis where we try to predict based on different conditions what the potential hazards would be. So, this happened to be the spread sheet I was using and I

forget the date, but.

MS. WEINER: Here.

THE WITNESS: At that time Kerry Long, who was the --

MS. BARNEY: Can we wait? I'm sorry, I need to say something for record real quick. During the break, Mr. Chu, you were able to obtain copies of documents that you looked at recently before your deposition?

THE WITNESS: Right.

MS. BARNEY: So, I'll just go ahead and mark those as Exhibit 1 and 2. I will mark the one-page document as Exhibit 1 and the multi-page document that has preliminary conclusions on it as Exhibit 2.

(Chu Deposition Exhibit Numbers 1 and 2, respectively, were marked for identification.)

MS. BARNEY: If it's okay, I'll come back to these in a little while for some questions for you and I'll try to pick up where we left off. Is that all right?

THE WITNESS: Yes.

EXAMINATION

BY MS. BARNEY:

Q. We were talking earlier about the Burnside plant and sort of your interaction with Percy at the plant and his role. It's your understanding I guess because you have such a close relationship with Mr. Bell that there have been leaks on the CIP, the HIP and the converter for almost two years. Is that your understanding?

A. Yes.

Q. And those leaks have been pretty continuous with patch jobs here and there, but never really being able to shut down the leaks, is that right?

A. Yes. They were having problems trying to locate them and even if they locate them to try to be able to make a lasting repair. They tried to control it with hoses to suck the leaks into the drying tower.

Q. What is your understanding of the hose apparatus that they have attached to the equipment?

A. What do you mean?

Q. The black plastic hoses I think is what they are.

A. Mm-hmm.

Q. Are you familiar with the hose system at Burnside?

A. Yes.

Q. Did you come up with that system?

A. No.

Q. Have you suggested the use of that system at any other plant?

A. No.

Q. Did you suggest that system at Burnside?

A. No.

Q. So, that was a system that was sort of created I guess by Gene Clemons, the maintenance supervisor?

A. No, it was before that. I don't really remember when it was put in place. I mean, the concept is all acid plants at one time or another would have a gas leak and even at Red Lion we had an external leak on a hot heat exchanger, you know, and the only way to control it while we plan permanent repairs is temporarily run a hose that connected the drying tower, which operates

under vacuum conditions, temporarily connected to the location of the leak.

In fact, the person who suggested that at Red Lion originally was maintenance supervisor at Burnside.

Q. Oh, okay. Who was that?

A. James Harman, H-A-R-M-A-N. So, it is an effective way to temporarily control a leak, particularly a leak that is not very large, but it is not intended to be a permanent solution.

Q. When you say temporarily at Red Lion, how long did they use that hose system at Red Lion?

A. I'm talking about weeks, less than a month. I don't remember exactly. What it entailed is that I think the leak happened in the wintertime. Sulfuric acid, strong sulfuric acid, has a tendency to freeze and that causes a lot more problems. So, we had to pick a particular time of the month when the weather was warm enough and we had the necessary resources, people and procedure, to address the leak.

Q. And at Red Lion it took almost a month to do that, to get that right time?

A. I'd say less than a month, but I don't

remember exact dates, but, we run the hoses, again, it was temporarily. There is a manifold system that connects certain process equipment, specifically pump tanks, to control vapors that are given off by the acid that is contained in a pump tank. Those are manifolded into the drying tower. That's a normal design.

Q. That was at Red Lion?

A. Normal design in any acid plant that has a pump tank. You look at the pump tank as a reservoir that pumps, draws acid from and circulates around the towers; but, of course, if you have strong acid, you have tendencies of off gases like S02 to be given off. So, typical acid plants control that by installing ducts that connects the pump tanks into the drying tower. So, at Red Lion what they did temporarily is out of the same manifold connect hoses to the source of the leak at the gas to gas heat exchanger, hot heat exchanger. So, it was put in place to control the leak, plan and execute the repair, and taken off.

Q. And I take it you were involved with the plant when that occurred at Red Lion?

A. Right, I was responsible for the plant at that time.

Q. About what year was that or how far before they started going into idle would you say that was?

A. Oh, that would have been I'll say if not 2008, 2009. I will say about a year before we idled it. I'll say 2009.

Q. So, you were okay with using that system as a temporary measure?

A. Mm-hmm.

Q. Was there any discussion when you all implemented that at Red Lion as to how long, you know, what was the outside time you would want to operate like that?

A. Not a specific time, but it was the plant manager's directive that this was temporary, that we -- you know, we could not operate like that. So, eventually we had to take a cold shutdown because we did try to make some repairs, but it continued to leak. We found out that there was a problem in the initial installation of the heat exchanger. They should have welded inside the duct as well as outside. They only welded

outside. So, we had to take a cold shutdown, figure out a way to weld it internally and did the repair, stopped the leak, discontinued the hoses.

Q. So, at Red Lion they took a cold shutdown for the specific purpose of addressing that leak?

A. Right.

Q. How long were they shut down?

A. I don't remember exactly, but I would say a week.

Q. Is that the only time that you can recall Red Lion having a cold shutdown to repair a gas leak?

A. Yeah, that's the only one that I recall. Sometimes we do have leaks in the duct, but because part of that plant is in a vacuum we are actually leaking air into the system. So, in those cases sometimes we can afford to wait a little longer.

Q. That's where you are sucking the atmosphere into the system --

A. Right.

Q. -- rather than putting gas out?

A. Right, right. Again, I'm not really

involved with the maintenance side of the repairs. There might be other leaks that can be addressed by just if not repairing the leak specifically, you can build boxes around it to contain it for a period of time until the next scheduled shutdown where you remove the containment box and effect a more permanent repair of the duct or the heat exchanger, but, that's the only time I recall using the hoses, again, for the temporary repair.

Q. That you talked about earlier?

A. Right.

Q. During that time period, that three to four weeks at Red Lion or so, when the hose system was used were those black plastic corrugated hosing material?

A. Yeah, we started with that and sometime after that we had to switch to stainless steel. The reason being that if you use the black hoses to stop leaks if you are sucking things like S03, S03 will react with moisture in the atmosphere because you don't selectively just suck a leak. You suck the neighboring area. So, you end up sucking a portion of ambient air that contains

moisture and moisture water in S03 form, sulfuric acid, and reaction of S03 and water generates heat and those corrugated pipes are not designed to handle the heat. So, eventually you can start melting them or putting a hole in it.

That's why we never think of it as a permanent solution. It's just a way to control it where you can better plan a repair.

Q. So, when you all switched to the stainless steel hose system at Red Lion during that temporary time period, was all the hose switched to stainless steel?

A. No. Only the areas where they're most susceptible to the high temperature, but even stainless steel will be susceptible to corrosion at high temperature in acidic conditions.

Q. During that time period at Red Lion, that less than a month or so, did you have to run any calculations about the amount of gas that was escaping during the leak?

A. No. Because for the most part the leak was not big enough and I guess since the gas duct that was leaking contained some S03 you can visually see if it was leaking even if it wasn't

contained. Of course, there would be times because the wind would move the hose or something it was part of the procedure was for the operators to inspect the area on a regular basis and position the hose properly to make sure that that wasn't the case. The leak that I had in mind is it was an area that was at least accessible and visible to the operators for them to monitor and try to control.

Q. So, at Red Lion the operators themselves actually were allowed and expected to adjust the hoses?

A. Yes, especially at night in most acid plants we only have two people, two operators, no maintenance folks at night. So, they are the only ones on-site that will do it. The roles of operators, maintenance, varies from plant to plant what each is supposed to be doing. Laying out the pipe or the temporary duct, that would be the role of the maintenance guy. Monitoring and making adjustments where there are no maintenance folks you have to rely on the operators to do that.

Q. That's how they did that at Red Lion?

A. Right.

Q. I guess the leaks of S03 are more visible at night, is that right?

A. No. Leaks for S03 are visible more so in the daytime because when S03 reacts with moisture in air it generates like a mist. What you are seeing is an acid mist. You are not seeing actually the S03. You are seeing the product of the S03 reacting with the moisture. S02 are gases that you cannot -- S02 you cannot visually see. We have monitors that detect S02 gas concentrations especially at ground level.

Q. A lot of folks have talked about it being easier to see S03 at night, but that's not your experience, you think it's easier to see -- I think it was the contrast with maybe the dark and white fumes that they thought it was easier to see.

A. Well, at night it may be visible if you have light, not just because it's dark. In the daytime you may on a cloudy day if the leak is at a high level and you are looking against a cloudy sky, you may not be able to see; but, again, it depends on I will say the leakage rate, but I

can't attest to the fact that you can see it better at night.

Q. I guess a light shining on it at night might reflect off of the vapors, is that right?

A. Yeah, right, right.

Q. It's more the light that you have at night than it is the night darkness?

A. Right. The darkness wouldn't help. If it's completely dark, no, I can't see -- you have to visually be able to shine and reflect against it, the vapor.

Q. Do you recall at Red Lion during that temporary time gas clouds of the S03 traveling across the plant site, like from one part of the site to another?

A. No. That would be very bad. Again, because, again, ground level, that type of emissions, particularly at Red Lion will affect the operators and maintenance folks first. Yes, we had the refinery right next to it on the fence line, but there was a buffer of tanks and other equipment before it gets to the refinery personnel and there is not a lot of surrounding area -- there are not a lot of people or

residents around the surrounding area.

Q. So, I guess at Red Lion you never had to or they never had to kind of clear workers away from one area of the plant because a gas cloud was moving that way from these leaks?

A. Not from leaks, from leaks from ducts if you are referring to that. They had to clear, for example -- yeah, there would be occasion where they have to clear personnel because, let's say, the spent furnace is used to decompose sulfuric acid. We burn fuel gas to create an environment where the spent sulfuric acid decomposes back to S02, some S03, water, oxygen, we burn the carbons in the spent acid.

So, in situations where, for example, there is an electrical power failure and it shuts down the plant, the furnace under normal operation is operating under a slight vacuum so the gases are drawn to the rest of the plant; but, when the process shuts down the blower starts coasting down and loses power, then you run into a situation that the furnace becomes positive. So, the hot gases start expanding out.

So, in that type of situation, yes,

there have been quite a few electrical power failures in the Delaware City area that causes the operators to get out of that area because you can't seal the furnace completely. There is going to be some gases escaping out of it.

Q. At Red Lion I guess during this temporary period where they had the hoses on some of the leaks on the equipment at Red Lion I take it the employees didn't have to dodge the gas --

A. No.

Q. -- and kind of watch the wind socks to figure out what direction --

A. Well, you always watch the wind sock. I mean, it's one of the first things we try to teach people, always know the wind direction, because, you know, unforeseeable situations happen; but, no, they did not have to dodge, no. You try to avoid the area if you don't need to be there, all right, but on the same token you have to have people go by there and inspect to make sure it's -- the hose was in the proper place and it was contained.

The gases that were leaking that would be a combination of S02 and S03. S03 you

see visually and S02 we had monitors on the fence line. That was an agreement that we had with the refinery, again, in case of emissions problem that it would be detected at the fence line before it gets to personnel in the refinery. I would not want to be in an area where I have to keep dodging clouds of S02 or S03 gas.

Q. At Red Lion during that three to four-week period did any employee complain that they had walked into a gas cloud of S03 or S02?

A. Not that I recall and, again, it would not be my -- I would not be the person that they come to.

Q. But you never heard that the leak got so bad that somebody claimed they had walked into it?

A. Again, not that I know of, no.

Q. Do you know how many feet of hose they used for that temporary fix in Red Lion about?

A. If I had to guess, less than 50.

Q. Did they have to change out the hose material from time to time? Did it actually melt down and have to be replaced?

A. Yes, yes. Again, that was the purpose of

the inspection.

MS. BARNEY: Let's take a lunch break.

(Lunch recess.)

EXAMINATION

BY MS. BARNEY:

Q. So, you started being involved with DuPont Burnside when? Did we say middle of 2010?

A. Somewhere in the first quarter of 2010. Again, it was a transition where I felt I need to finish some stuff at Red Lion and get the plant in idle and then switch over.

Q. When you first started working with Burnside these leaks we were talking about, which started two years ago, those were not happening then?

A. No, no. Again, the plant at that time was probably less -- the CIP and HIP were less than six-months old at that time.

Q. Were you worried at that point about how the CIP and the HIP were going to perform because of your experience at Red Lion?

A. Worried not in the sense that I expected the CIP to have some leaks, but worried in the

sense that the Burnside was a retrofitted plant, was converted from single to dual absorption, that the distance between the IPAT, interpass absorption tower, and the CIP is unusually long. They usually are a lot closer together. So, the chances for the gas to cool down and the acid mist that would be in the gas coming from the absorption tower to condense was more likely. In fact, we made some changes to alleviate that.

Q. What changes?

A. I had the plant install what they call a boot, B-O-O-T, which is just a small vessel to help catch the acid that might collect in the duct before it gets to the CIP.

Q. I would like to show you a document that is Bates labeled DSF618 through 634 and this is an e-mail on top from Kirk Bailey to you and Dan Monhollen and some other folks --

A. Mm-hmm.

Q. -- dated January 26, 2012. Do you remember seeing this -- and attached, I'm sorry, attached is the December 6, 2011 DuPont Burnside Pegasys test.

A. Yeah. I'm sure I'm seen it, yes.

Q. So, that Pegasys report looks kind of familiar?
A. Yes.
Q. It's ringing a bell?
A. Well, yes, yes.
Q. That report states that it was run based on data from December 8, 2011, I believe, if you look at page 625 --
A. (Witness complies.)
Q. -- in that first paragraph.
A. Mm-hmm, yup.
Q. Is that your recollection?
A. Yes.
Q. Let me show you an e-mail --
MS. BARNEY: I guess we should mark this first document as Exhibit 3.
(Chu Deposition Exhibit No. 3 was marked for identification.)
EXAMINATION
BY MS. BARNEY:
Q. And then I'll show you an e-mail, dated December 9, 2011, which seems to be referring to that report. I'll show you what is Bates numbered 866 through 874 and we'll mark that as

Exhibit 4.

(Chu Deposition Exhibit No. 4 was marked for identification.)

EXAMINATION

BY MS. BARNEY:

Q. And that's a more complete copy of the e-mail and that's an e-mail from you dated December 9, 2011 to Dan Monhollen with a cc to Percy Bell.

A. Mm-hmm.

Q. And you are commenting on the Pegasys survey?

A. Yes. Did somebody explain what the Pegasys is about and what it covers?

Q. No. Why don't you do that as briefly and as lay person as possible.

A. The Pegasys test is designed to assess the performance of the catalyst and the converter to see how efficient it is in converting S02 and S03 and, also, the secondary objective is to determine whether there is internal gas leaks in gas to gas heat exchangers. The reason that's important is because internal gas leaks affect the conversion performance.

So, it's a very good tool that we use to try to determine and try to ascertain which areas may be causing the problems in conversion and, therefore, emissions. The one thing it doesn't do it cannot determine the extent or magnitude of external gas leaks.

Q. This report would not really tell how much gas was escaping from the CIP, the HIP or the converter as of that date?

A. No, no. The reason that these e-mails were exchanged and prompted is, again, I look at the plant performance, conversion being one of them, and the outcome, emissions, being another as part of my role. The routine practice of a plant is to do pressure surveys and that's what you see in some of the data that I was referring to thanking Dan for sending me pressure survey data because 20 percent of that data has to be done by field measurements. The rest I can get from the DCS.

So, it's a normal practice that I asked him to do at least once a month. Again, he gives me more of a picture of how the overall plant is performing, not only conversion, but

pressure drops, et cetera. So, my comment when I say for the Pegasys that it did not indicate any internal gas leaks was reassuring because as you can see based on pictures that we have taken of the heat exchanger this would have been during a boiler leak; but, evidence that we have seen during of the turnaround that we had in April 2011 it was a lot of acid was being collected at the inlet of the CIP and that's never a good thing.

So, I was concerned about -- external leaks we can see, you cannot ignore. Internal leaks it starts slowly, but they always progress. That was the purpose of the test -- I mean, of the e-mail exchanges. That's the purpose of running a Pegasys test.

Q. So, the internal leaks might have an impact on the environment through the stack?

A. Right.

Q. But the external leaks have the impact just at the leak point?

A. It still impacts the environment, but the reality is we don't have monitors. You know, everybody in the plant -- emissions in the plant

are monitored and measured based on emissions points, which is the stack, so, we have gas analyzers at the stack.

Q. And that's for S02?

A. That's for S02.

Q. There are no analyzers anywhere on the Burnside plant or Red Lion for that matter for S03, right?

A. There are no such analyzers. I will say there is no such on-line analyzers. Depending on the plant, depending on the air permit at each plant, they require on a yearly or bi-annual basis to bring in third-party, you know, the State being one, the plant being -- a third-party contractor to do measurements that confirm that the S02 on-line analyzers are working properly, as intended, and also to measure acid mist from the stack.

A normal stack in an acid plant should be clear. You should not be able to see anything. There is some acid mist that comes out but because the concentration is so low they're not that visible. So, you have to bring an analyzer that -- I don't really know how the

word, really I never operated one, but you physically have to collect the gas -- sample the gas that is coming out of the stack and you can calculate the milligrams of sulfuric acid per standard cubic feet of gas that is evolved out of the stack.

Q. What kind of gas is that measuring?

A. Sulfuric acid mist, which is an indication -- again, you cannot separate between S03 or sulfuric acid itself, but any kind of S03 that escapes in the atmosphere, whether it's from a stack or from a gas leak, eventually becomes sulfuric acid because of the reaction of S03 with water.

Q. So, at that point they're measuring the sulfuric acid mist to try to figure out how much -- they're just measuring the sulfuric acid?

A. There is a limit. Again, there is a limit, but for most plants -- or, for all plants, not only in the U. S. it's not feasible to be able to measure the S03 acid mist continuously. The procedure is complex enough and it requires a lot of expertise to be able to measure accurately. That's why by permit it's only done

once or twice a year.

There is a qualitative measurement called opacity of the stack. If there is S03 or acid mist coming out we call it the stack becomes visible. Generally in an acid plant when opacity exceeds ten percent, again, it's a visual qualitative measurement. People have to go to what they call a smoke school to be trained in, okay, this is what it looks like, this is five percent, this is ten percent, this is 20 percent.

So, plants are required to qualitatively inspect the stack once a day, it can only be done in the daytime, and see is the opacity more or less than ten percent. So, if it's more than ten percent, it means there is some unusual amounts of S03 and acid mist coming out.

Q. And the permit -- well, and I realize you are not the environmental person, but you may know the permits don't allow for emission of S03, they just allow for S02, right?

A. No. The permit has emission limits. All acid plants that I know of in DuPont have emission limits for S02, acid mist, and, again,

opacity, again, a qualitative measurement.

Q. And that's coming out of the stack?

A. Coming out of the stack. The amount of S02 that each plant is allowed to emit varies depending on the state regulatory, depending on the age of the plant; but, again, I don't know right off the top of my head what the S03 limit is, but there is an acid mist limit I understand.

Q. The S03 becomes an acid mist when it comes out of the stack and that's what you are saying every now and then an outside contractor would come measure the mist coming out of the stack?

A. Right, quantify it. Again, the stack, once the opacity is evident we know it's acid mist, but we don't know if it's because from acid mist that is carried over from the tower itself or the S03 has not been absorbed fully because once it comes out of the stack you cannot differentiate whether it was originally S03 or originally sulfuric acid.

Q. It could be sulfuric acid itself as the original chemical coming out?

A. Right, right, right. Either way it's not

good.

Q. So, if you see a leak of the kind we were talking about earlier that comes from the equipment, that would be S03 gas because it's coming out of the process at that point?

A. Depending on where. For example, the gas that is first going to the converter only has S02, but once -- and the converter, let's say, at Burnside have four compartments. So, the first time the gas goes into the first compartment there is no S03, but after that S02 gets converted to S03 and the S03 concentration goes up, the S02 concentration goes down. Then, after it comes out of the third pass probably 93 percent, 95 percent of the S02 has been converted to S03 and that goes into the IPAT, interpass absorption tower, where the S03 is absorbed so the gas coming out of that absorption tower is only S02.

That goes into the fourth pass where the rest of the S02 is converted. So, by the time it goes through everything typically depending on the acid plant for a dual absorption plant is 99.2, 99.7 of all the S02 has been

converted to S03. So, depending on where -- which duct, which gas to gas heat exchanger, the various concentrations of distribution of S02 and S03.

Q. If there were leaks in this equipment, the HIP, the CIP or the converter, and you could see them then that would tell you it's S03 gas?

A. Right, and S02 you cannot see. It doesn't mean there is no S02, but there is out of the CIP if you see S03, there is going to be S02.

Q. Do you recall whether around the time of this Pegasys study, December 8th of 2011, whether the leaks that we have been talking about earlier, the ones that have lasted two years or so at DuPont Burnside, had those started do you know at the time this Pegasys report was done or was it shortly after that?

A. I don't recall exactly. My guess is some of them already started. That would be my guess. Again, the reason for the Pegasys test was not to ascertain or quantify external leaks, no. As a process engineer I was more concerned with what was happening internally. If I see an external leak in the gas heat exchanger, I worry about

internal leaks too, which then it starts affecting the performance of the plant and the ability for the plant to operate within air permit limits.

Q. But nobody is measuring the S03 gas that is escaping from these internal leaks, is that right?

A. I can't say that. That would be the role of the plant. If there is a leak we can see from the Excel spread sheet that I showed you earlier. Those are the type of calculations that acid plants will have to use to ascertain based on the operating condition of the duct or equipment, concentration of gases, S02, S03, pressure, internal pressure, conditions, ambient conditions, that's a way to estimate gas leaks.

Q. That's something that you said had to be done at the plant level? You couldn't do that from Wilmington?

A. No. Because the equation has a theoretical basis, but the -- and things like composition, temperature and pressure that can be measured or estimated very accurately. Two components that are critical for the gas leak

estimate is the size of the hole that is leaking and, which unless you can visually ascertain, is hard to do, and the other thing is the duration of the leak, you know. Usually one can determine when the leak was found you can say that was -- or you can determine the time where a process, a procedure, was implemented to control the leak. They are known as when did the leak start.

Sometimes you have to make an estimate and that estimate can be based on, well, 1100 hours yesterday operator passed through the area and there was no leaks. So, you can be conservative and say the leak we're going to start then. So, the equation, the calculation, is simple, is direct, but the two unknowns -- the two uncertain parameters are the size of the leak and the duration.

That has to be determined by an incident investigation where you get a group of people that agree, okay, based on interviews, based on what happened at the plant during that period of time, what value the duration or upon inspection of the gas leak is estimated as an equivalent cross section of area of a dime, a

nickel, a dollar, whatever, so.

Q. If you don't have -- well, let me back up. If you can't locate the leak source, the crack or the hole, then you can't do a calculation of how much gas is escaping?

A. Well, you can always do the calculation.

Q. Okay, you are right. In order to get an accurate calculation of the gas leak you would --

A. I would say even if you get a size, okay, you are not actually measuring the leak to say, Ah, this correlation is applicable because there is a lot of assumptions going into that correlation; but, it's the best empirical revelation that I've found and it's used industry-wide to ascertain leakage from equipment and ducts because measuring fugitive emissions are very hard.

A calculation can be made, but it has to be done with the realization that whatever number comes out what the uncertainties are and I will say a good engineer would do a calculation, look at the number and say does it make sense? The number he gets physically does it make sense relative to the amount of gas that goes through

that duct equipment, does it make sense or not?

Q. So, are you saying that even if you know what the size of the hole and the crack are and you do your formula there is still some uncertainties about the estimate?

A. Well, it's the duration. A lot of times -- the other uncertainty is the duration. You know when you found the leak, you know when you did the containment. You contain it so that it doesn't leak worse or so that it doesn't leak to the atmosphere, you have contained it, for example; but, the uncertain part is when it started, you know, because it would be very unlikely that as you pass by the leak started right there and then.

Q. You try to go back to the last time somebody saw no leak at all and --

A. Even that time, did he actually look at that area? It's a calculation. You are just trying to do the best estimate realizing what the uncertainties are and I look at this type of calculation, any type of calculation, does it make sense, you know. It would be hard to explain to somebody and say, Well, we found a

leak, then I'm going to assume the leak started an hour ago. How do you know it's an hour ago? Sounds like a nice good round number.

Q. Makes the math easy?

A. It makes the math easy because the ratio in pounds per hour just multiply it out. Again, I'm not trying to avoid, but in the calculations as an engineer I try to see what the uncertainties are. Just because I can calculate the number exactly very precisely.

Q. If you have the information?

A. No, no. I can calculate very precisely with a calculator, how many digits do you want, I can do it to a thousandth of a gram, but it won't be -- I can tell you it won't be accurate.

Q. So, if DuPont wanted to know how much gas was escaping they would need to know the number and size of the holes and cracks in the vessels, right?

A. Yes.

Q. Then, you would have to run a calculation for the whole duration of those leaks to get an accurate estimate, right?

A. Yes.

Q. And then you would have a complication I guess of a leak that is ongoing so you might be able to come up with a per hour estimate, but you wouldn't have a total release estimate because that is still happening, right?

A. I'm not sure I can --

Q. Well, if the leak is continuous and it's ongoing, then the best you are going to come up with would be a per hour rate of release, right?

A. Well, yeah, the calculation -- the form of the calculation is a release per unit time. In fact, I think it's in seconds.

Q. I'm sorry, okay, seconds.

A. Correct. It's a release per unit time. So, but that release per unit time the most difficult parameter to determine is the size of the hole. So, if you are looking at the release per unit time, you have one big unknown, uncertain value. If you are looking for the total amount of release, then duration is an unknown. Now you have two parameters. You go -- I mean, to add complication to it is the size of the hole never stays the same. It usually grows.

Q. And it expands with heat?

A. Expands with heat. There is a number of uncertainties that, again, the solution is not trying to spend a lot of time estimating it. The solution is to try to do a repair. Because, again, the calculations a lot of times the calculations if not -- the only reason the calculations are made I guess to ascertain whether the magnitude is high enough to see if it's reportable, it becomes a big issue. As a process engineer, you know, it's not something that I like to factor in and say, Well, that's just normal practice, lost production.

Q. So, since DuPont was having trouble locating the holes and cracks in the equipment that were causing these external leaks they really weren't in a position to calculate the amount of gas that was coming out of those holes and cracks, right?

A. Again, they can always calculate. Somebody can always calculate.

Q. I'm sorry, they weren't in a position to accurately calculate the amount of gas coming out of the holes and cracks?

A. No.

Q. Do you know now whether -- have you seen now any accurate documentation of the size of the holes and cracks in the HIP, the CIP or the converter?

A. No. I actually never been involved in an incident investigation that helped ascertain the -- the plant take it upon themselves to do the investigation, assessment and calculations.

Q. We didn't cover this part, but you are no longer with the Acid Technology Center, right?

A. That's correct.

Q. You transferred at some point to -- maybe we did talk about that. They had a long transition?

A. Right. Actually, I applied for a transfer sometime in March of 2012. It was approved, well, in principle by my then supervisor and my current supervisor, but HR works in mysterious ways and it wasn't officially approved until October of 2012. But once there was a mutual understanding between my current group and my old group that I was going to leave the group one way or the other I transferred pretty much all my responsibility to Burnside and

dedicated my time to my new group, which is Global Engineer Solutions, still part of DuPont. And the only involvement I had with Burnside related to the replacement of the spent furnace that I think they're going to install this month.

Q. And was your -- as you were applying for a transfer to change positions was it a factor that you weren't enjoying your working relationship with the Burnside management too much or the way they were handling things?

A. Yes.

Q. Would you have liked to see -- let me strike that. Were you disappointed to see them using this hose system for so long and relying on that?

A. Yes.

Q. Did you have any conversations with Tom Miller or anyone else in management at the plant about that issue?

A. I had very limited discussions with Tom Miller. In my initial discussions with them led me to believe I would be wasting my time trying to discuss anything related to the hoses.

Q. To the --

A. To the hoses. I had made it known that having the hoses for temporary solutions and, again, temporary is a very broad term, right, but I did not agree with the principles, but we still were using the hoses. There is a number of things. It was the working environment, the operating principles of the plant in general. I really learned enough of a new acid plant that I saw no value to continue there. Even though I think not only with Percy, but with the operators in general I had a very good relationship, but that was enough.

Q. So, unlike Red Lion you were treated more like an outsider by the supervisors and the management?

A. Yeah, again, I was an outsider. I don't report to the plant. So, technically I'm an outsider and I tried not to compare too much actually to Red Lion. I knew it was a unique situation, but in general this was not -- I didn't see it worthwhile for me to continue.

Q. During this time period where you were working with the Burnside folks did you get to know Jeff Simoneaux, one of the operators?

A. Yes.
Q. And maybe Drew Tabor, did you get to know Drew?
A. Yeah. I mean, I knew -- I met all the operators, right, and some operators were more friendly than the other ones; but, I think there was I would like to say it was a mutual respect. I respect what they do, what they're trained to do, their responsibilities, and they respect I think what I did because I wasn't trying to establish a hierarchy between engineers, operators.
Q. You got that mutual respect with the operators, but maybe there wasn't so much mutual respect with the plant manager, is that fair?
A. Yes, I would say that's fair. I can't pinpoint to anything that was overly -- DuPont doesn't tolerate lack of respect so there is nothing overly.
Q. Overtly?
A. Overtly disrespect. Just, again, just opinion, personal feeling, interactions that it becomes evident at least to me.
Q. Do you recall -- and you may not remember

the date, but you are pretty good with dates, so, you might -- do you recall around February 1st of 2012 being involved in some discussions with some of the operators about Jeff Simoneaux reporting a gas leak and maybe the plant manager's reaction to that?

A. Yeah, yeah, I don't remember exact day. I remember the event where I go to the plant and Jeff and others described the situation to me and I -- again, it took me aback what they were describing, but I can't say -- I wasn't present -- I wasn't at the plant at the time that it took place.

Q. How did you first hear about it? Did somebody call you?

A. No, no, no. Either I was there that week or I just came. Again, in that period of time I was still -- February 2012 -- I still had some responsibilities and I probably haven't applied for my new job. It hasn't been approved yet. So, I just happened to be there and, I mean, usually the first thing I do after dropping off my backpack in the office is go to the control room and that's when I was told.

Again, I don't think it was something that they called me specifically about. Percy and others have called me about situations before when I'm not at the location. So, if you know the date somebody probably told you that I was there and I was told specifically, yes.

Q. Do you remember calling some of the operators who had been there the night of this incident?

A. Yeah, because I think Jeff told me about it first. So -- again, it was just incredible the reaction that Jeff described that Tom Miller had taken. I asked him who else was there. I don't exactly remember who the other operators were, but I got verification that, yeah, that was the case. Apparently Tom refused to go outside to take a look at a leak. Is that the situation?

Q. That's what I think is written in this log. This was the logbook entry for February 1st. I think some of it was written by Jeff himself.

A. Yes, yes. Yes, again, I do remember the day, the situation, collaborating with other I forget -- his operator partner, that, in fact,

they witnessed that and I will say that was another nail in the coffin that my tenure at Burnside was overdue.

Q. You were able to verify with the other operators who were working that night that what Jeff said had taken place with Tom Miller had actually occurred?

A. I was able to -- they were able to collaborate. I cannot verify that I was there and heard what Tom said, so, yeah, the other operators collaborated. Again, I know Jeff and the other operators that I had -- I believe what they said. I was not -- I didn't feel comfortable enough to do what I would have normally done. I didn't feel comfortable enough to ask Tom whether that, in fact, took place.

Q. You didn't feel like you had a good enough working relationship to approach him about that?

A. Yes. Again, normally that would -- if it's somebody I know or I did not believe that he could say something like that, you know, maybe it's somebody I know who said it and just in the heat of the moment I would just, Did you really

say that? But, you know, by then it's obvious that there was -- I felt an outsider, why would he -- I had already tried from the inception of when he was brought into the plant 2011, I think, the turnaround, which is unusual to bring in a plant manager during a turnaround. I tried to establish a relationship, introduced myself, and it was obvious that it was only one side, so.

Q. Meaning he was going to say how it is and that's that and --

A. Meaning that -- meaning that whatever he had to say at that time I was not interested.

Q. There was discussion or part of the issue that Jeff wrote about in this log entry was that he had started to cut back the plant when he saw this leak, he started to cut back the rates of the plant, and he has testified that Elizabeth Cromwell had agreed with his recommendation to do that.

A. Okay.

Q. But then Tom Miller arrived and overrode that decision and said not to cut back the rates. Do you recall anything about that, whether they -- whether the rates kept going at the regular

rate?

A. No. It can be verified by the DCS very easily. That part of the conversation I don't recall. I would say it would be a normal practice to if you have a leak to cut back on rates because that reduces the internal pressure. So, that minimizes. That doesn't get rid of the leak, but it reduces the leak until somebody can ascertain whether the plant is to be shut down or continue running. So, if Jeff did that, that's an excellent practice. If he checked with Elizabeth, that was the normal thing to do.

Q. Have you ever known a plant manager to override a recommendation by an operator to cut back the rates when there was a leak or have you ever been presented with that situation?

A. I haven't been presented with that situation. I mean, a plant manager has the authority on the plant. Again, depending on circumstances, yeah, he can override it if a leak is not big, but there has to be a reason; but, I never firsthand witness that so I can't say it never happens.

Q. Did you hear anything from the operators

that after that event they felt uncertain about how to report or whether to report?

A. Yes, yes.

Q. Were you ever in your role with Burnside ever asked to do any calculations on gas leaks?

A. By?

Q. External gas leaks.

A. Not directly. The spread sheet that I showed you was -- I don't think Kerry Long was management. It was the environmental guy and he just wanted me to check his calculations or check the parameters that were used to make the calculations. Burnside management per se never asked me to do calculations as part of incident reports.

Q. You obviously would have been capable of doing that had you been asked, right?

A. Incapable you say?

Q. You would have been capable.

A. Well, anybody can calculate. I would have done my best to ascertain the conditions and parameters where I can use those as a basis to make the calculations.

Q. You would have pushed pretty hard to try

to get an accurate size of the holes and cracks and maybe duration of some sort?

A. I would have tried -- I wouldn't call it push hard. I would have said, Dan, now, what are the facts knowing there are a lot of assumptions. One of the things I learned as an engineer you don't have all the information all the time or you don't have all the information every time. Sometimes you have to make assumptions and what I would like to do is state those assumptions clearly so that the people that are involved in the investigation are able to report either internally or externally that these are the bases and these are the uncertainties. I would challenge anybody to be able to measure accurately any type of leak such as from a duct.

Q. Without knowing the size of the cracks and holes?

A. Right. I mean, you know, at Red Lion I was involved in calculations because I was asked to do that. I was part of the incident investigations but, again, it's not something that is -- I can force the plant and say you must -- the calculations must come out from a document

that I issue. It's up to the plant to decide.

Q. Let's look back at the documents you brought with you. I guess we can start with Exhibit 1. Tell me about this document. You were trying to do that earlier and I made you wait.

A. Oh, okay, this is we -- based on literature reviews that we had done this is actually the best correlation that we can come up with that we can agree in the industry of how to determine gas leaks from equipment or from ducts or piping. It makes certain assumptions with regards to the ideality of how gas behaves, a real gas, and the parameters that come into play for the calculation are the difference in pressures between the process container, whether it's a vessel or a duct, and the ambient pressure. Takes into consideration the physical characteristics of the gas, composition, temperature.

And, so, those are physical parameters. Process conditions can either measure fairly accurately or estimate it. I discussed earlier the calculation makes -- it

estimates the mass of either S02 or S03 that is released per unit time and the highest uncertainty parameter is the area of the hole where it's discharging.

The second calculation that is typically asked for is how much, the quantity, the mass of the other component that is in question, S02, S03. So, the second uncertain parameter is the duration. So, this is a typical -- this is a spread sheet in probably pretty much all the acid plants in DuPont has a similar spread sheet that is based on this equation. It's used as a basis to estimate leakage rate and total amount of leakage.

Q. So, is this sort of a sample calculation or is this reflecting a particular event?

A. This was a particular event where there was a leak out of the duct exiting the 1st pass converter.

Q. Do you remember when this was done?

THE WITNESS: I told you yesterday, right?

MS. WEINER: I can't remember.

A. This was done in 2010.

MS. WEINER: He is referring to Exhibit 2 now.

THE WITNESS: No, no, Exhibit 1.

MS. WEINER: Oh, okay.

A. Is it important?

Q. The precise date?

A. Yes.

Q. If you know it, your best estimate is fine. If there is a way to determine it, you can tell us that too.

MS. WEINER: We can probably get you that after the deposition because you can check on your computer.

THE WITNESS: Actually, the file name shows the date. I know it was 2010.

MS. BARNEY: That would be fine.

A. So, this was -- at the time I had this calculation Kerry Long had asked me to check some of the parameters he was using as far as composition, pressures and temperatures and some of the constants and coefficients that were used in the calculation.

Q. Do you remember which parameters he was asking you to check?

A. All of them.
Q. Kind of the whole --
A. Pressure, temperatures, composition of the gas in the duct, exiting the 1st pass.
Q. He plugged in for you, I guess, the area of the hole that is on here?
A. Yes, yes.
Q. And then he plugged in a duration?
A. Either he plugged it in or I asked him what the duration would be. I mean, my effort was to make sure he understood what the process parameters, temperature, pressure, composition, that he was using the right ones, because, as I noted earlier, different ducts have different compositions, pressures and temperatures. I was able to pull up actual temperatures or estimated pressures of that duct for the time in question.
Q. And you can do that from your computer in Wilmington?
A. Right, process the data I can determine. Cross section area of the hole, duration --
Q. That has to come from the plant?
A. That has to come from an incident investigation, whether it's just directed by the

plant or outside.

Q. So, for this particular calculation the area of the hole -- well, the equivalent diameter of the hole was a quarter of an inch, is that right?

A. Right, because it's very hard to estimate an area of an irregular shape, so.

Q. So, the equivalent diameter is when you take the size and sort of convert it to an equivalent -- it's the best you can do to estimate the diameter?

A. The area of a circle is pi times the square of the diameter divided by four. So, one starts by saying I have seen the cross section area is this much and then you can perform a calculation and based on an assumed area you can calculate the diameter. Or, somebody looks at the hole and it's irregular and the largest diameter is one inch and the smaller one is a quarter, I think it's half an inch equivalent. It is what it is, it's an estimate.

Now you can understand why I say this is so uncertain trying to guess an area, but, again, sometimes you have to make an educated

guess.

Q. And that's just almost a conversion?

A. Right.

Q. Sort of converting an odd shape into a circle?

A. Right, exactly.

Q. You try not to lose too much in the process?

A. Right.

Q. But you are starting with a general understanding of the size of the hole you are looking at?

A. Right. The general understanding is the -- the assumption in this equation, no matter the shape of the hole, perfect circle, a square, a star, completely irregular, no matter the shape as long as it has the same area it will give -- it will calculate a leakage rate based on that equivalent area.

Q. So, in this example a hole with a diameter -- let me go back to area. The area of the hole in this example was 0.00034 square feet?

A. Yes.

Q. And, so, that size area of a hole given

all the other process parameters here, temperature, pressure, generated a leak of S03 of 145 pounds for a duration of 86,400 seconds?

A. The equation give a leakage rate of .0088 pounds per second.

Q. Where is that on here?

A. Mass calculation.

Q. I see, okay, Q equals?

A. Right, that is the leakage rate --

Q. Per second?

A. -- per second of total gas. And based on that total mass flow and based on the duration for the release, again, 86,400 seconds, which translates to, I don't know how many hours. Based on the composition of the gas having 19 weight percent S03, five weight percent S02 that's how we arrive to a total release of 145 pounds of S03 and 38 pounds of S02.

Q. You can use this calculator if you like, but I ran that 86,400 seconds and if you divide that by 60 --

A. Yes.

Q. -- you get how many minutes, is that right?

A. Right. And you divide it by 60 again.
Q. I'll let you do it if you can use that phone.
A. 1,440 hours -- excuse me, minutes, minutes and 24 hours.
Q. This one was done on a 24-hour period?
A. Yes. So, that you can see it was either conservative estimate or maybe not so conservative. I have no way to tell without somebody describing the scenario that, okay, this is a basis of duration for and which will determine the total amount release.
Q. Maybe they just were doing a per day, they just picked a day.
A. Exactly, and I just want to make -- you know, things like what Kerry Long will know is composition of the gas because he has to understand how much S02 got converted to S03 after the 1st pass. He might be able to get the pressure and temperature from the DCS. The temperature is directly -- is evident, but the pressure has to be estimated because there is no pressure meter right there. So, it wouldn't be a case that I was involved -- this may not be the

values reported.

The objective of this exercise, as I say, is to make sure this is the right parameters, process parameters, by which he should use to make the calculation.

Q. Can you calculate -- if I gave you a different area and everything on here stayed the same, can you estimate what the increase in pounds would be or is that something you --

A. Depending on -- do you want to double the area?

Q. Let me see. Yes, why don't we first try doubling the area.

A. Then double the rate, it would be .0176. You can see that the leakage rate is directly proportional to area. So, you double the area, you double the leakage rate.

Q. And the leakage rate is Q on here, right?

A. Q. It's in the mass -- again, that is the mass of the total gas. There will be some oxygen in there, some nitrogen in there, some CO2.

Q. So, if you -- the percentage of that doubled rate that is S03 how do we arrive at

that?
A. Again, because we didn't change the concentration --
Q. We just doubled.
A. You double the flow, same concentration, you double the leakage rate for S03, which would be 290 -- if you maintained the same duration, 24 hours, it would be 290 pounds of S03 and 76 pounds of S02.
Q. If the area of the hole was twice what it is on this sheet right here?
A. Right, right. I'm glad you didn't say 2.3 higher. Then, I can't do the math in my head.
Q. Can you tell me about what the area would be for a hole that is eight inches by 1.16?
A. Eight inches by 1/16? It would be .15 square inches.
Q. And that if we -- let's see. So, you would divide I guess by the area on this page?
A. No. It would be -- this area is in square feet, so, it would be .00345 square feet.
Q. So, about ten times --
A. Yes. Let me verify that since this is

not a familiar calculator. I didn't realize I had to do calculations, so.

Q. I didn't either.

A. You say eight inches, right?

Q. Yes. By 1/16.

A. .00347, so, about ten times.

Q. A hole that size or a crack that size would have an area that is about ten times the area that was used on Exhibit 1?

A. Right, if only thing that changed was the hole size.

Q. If all the other conditions were the same?

A. Right, because, again, pressure, temperatures, pressure in particular, the differential pressure between the internal duct and the ambient has a big effect on leakage rate.

Q. So, if the area reflected by eight inches by 1/16-inch crack, if that area is ten times the area that was used in the Exhibit 1 calculation, then the total gas amount where it says Q on Exhibit 1 would also be ten times that?

A. Right.

Q. And then the S03 mass calculation would

be ten times the 145 pounds?
A. Right, if everything else remains the same.
Q. So, if everything else was the same an eight inch by 1/16-inch crack would generate under these conditions in Exhibit 1 1450 pounds per hour --
A. Yes.
Q. -- of gas leak?
A. Of S03 would be released in that 24-hour period. I think you wrote pounds her hour.
Q. Oh, I did. What is it supposed to be?
A. Total pounds for the duration, which was 24 hours for a 24-hour hour period.
Q. 1450 pounds for a 24-hour period and that's of S03?
A. Right.
Q. Where on Exhibit 1 does it tell you the rate at which the plant was running or the assumption that was made about the rate at which the plant was running when this calculation was done?
A. Because the rate would not have -- the production capacity will not be part of the

calculation directly. Indirectly it does. The higher the production the higher the pressure in the process duct. So, even though it doesn't show -- the higher the production the equipment has to work harder to push more gas, pressure goes up, leakage up.

That's why, again, Jeff did the right thing or any operator did the right thing if there is a leak and if you don't have the authority or it's not bad enough to shut the plant because shutting down the plant -- I mean, restarting it could cause more damage. The right thing to do is slow it down. By slowing down the rates you reduce the pressure, you reduce the leak, the leakage rate.

Q. Where on Exhibit 1 do you see the pressure reflected?

A. Under P source pressure absolute and the equation is the third parameter and he also factors into the denominator inside the equation. So, there are three places where P plays a part, but you can see the pressure is also directly proportional.

Q. To?

A. To the leakage rate. In this case doubling the pressure does not necessarily double the rate. You have to go through the whole calculation to determine that. In fact, I won't --

Q. I'm not going to make you do that with my cell phone.

A. I can guess what it's going to be, but Monique may not be happy with me guessing. Production has an effect. It's not a number that is plugged into the calculations, but it's reflected in pressure.

Q. Is there a rough estimate that you know of the proportion between the increase in pressure and the amount of S03 gas or is that not --

A. No. Pressure is a function of production rate. S03 concentration is a function of which duct is leaking, right?

Q. So, on this calculation do you have a rough estimate of if you increase the pressure on this calculation what it does to the S03 mass calculation?

A. The total mass?

Q. Yes.

A. Yes, if you -- again, if you increase the pressure, you increase the leakage rate and since the leakage -- even though the concentration of S03 hasn't changed because you increase the leakage rate you are going to increase the amount of S03.

Q. By looking at this pressure does that tell you under normal plant operating conditions about what rate the plant was operating at?

A. If I was more in tuned to the plant, yes, but, again, there is a correlation. By looking at it I can't tell. I mean, to me the easiest way is I can pull that data directly from the DCS what that production rate was at that particular time. I don't need to try to guess.

Q. There is something on the computer where we could see every day for the last two years what the production rate was and what the pressure was and what the temperature was?

A. For the production, yes. For the pressure there is only a limited number of pressure transmitters, recorders, throughout the plant. So, that's why for this particular

situation I had to estimate the pressure in that duct based on two pressure transmitters upstream and downstream, estimate pressure losses in between and what is the reasonable pressure in that location.

To confirm it, again, based on those estimates we do monthly field surveys of what the pressure is in not exactly that location, but very near; and, so, I can correlate whether the estimated pressure at that particular point is reasonably accurate.

MS. BARNEY: And, Monique, I think we requested any data that went into calculations like this. I think that was one of my requests for production. So, I would just ask if you could check on producing the -- is it the D --

THE WITNESS: DCS data.

MS. WEINER: I will look into, first of all, whether it was asked for in the first place, I will look into it.

THE WITNESS: DCS is data collection system.

EXAMINATION

BY MS. BARNEY:

Q. All you remember Mr. Long asking you is just to confirm the parameters that you already talked about?

A. Yeah, the process parameters.

Q. He didn't say anything about why he was doing the calculation in the first place that you recall?

A. Well, he didn't have to ask me this. It's a leak out of the 1st pass outlet.

Q. And that was in 2010 before these other leaks really started, right? This must just have been another leak?

A. I think this was early when I start supporting Burnside.

Q. If there was a leak back then it must have been one that they were sort of able to get under control because, as I understand it, the leaks that they couldn't keep under control or get repaired started in December 2011, is that right?

A. Okay.

Q. They might have started earlier I guess

is what --

A. Yeah, I'm not sure of the exact dates. I will say the leaks in itself is not something that they would communicate to me for particular reason that I wouldn't be the specialist to help them fix it.

THE WITNESS: I'm going to step to the restroom.

(Brief recess.)

EXAMINATION

BY MS. BARNEY:

Q. Let me show you a document that we'll mark as Exhibit 5.

(Chu Deposition Exhibit No. 5 was marked for identification.)

EXAMINATION

BY MS. BARNEY:

Q. This is Bates labeled DSF0000083. I ask you to look at that. Is that basically the same calculation type that we were looking at in Exhibit 1?

A. Well, technically I will say no. It's missing the molecular weight of the gas. If you compare Exhibit 1 and 5.

Q. Exhibit 5 is missing the molecular weight?

A. Right, but that's not to say that the calculation is wrong. For example, this formula --

Q. At the top?

A. -- at the top of Exhibit 5 is just -- it doesn't play into the calculation itself. It's just to show this is the formula that has been used just like I have it here.

Q. On Exhibit 1?

A. Right. I know this is not -- in Exhibit 1 this item is just an image. The formula used here to do the calculations -- I mean, the calculation is based on this formula.

Q. In Exhibit 1?

A. Right.

Q. Okay.

A. So, I would have to either run the same calculation or look at the original spread sheet and check the formula that is in that cell or do the calculation manually on a calculator with all these parameters to see if it gets that. So --

Q. And that's for Exhibit 5?

A. Exhibit 5. So, the result that is shown I don't know if it's using the right formula because the represented formula does not match the one that is supposed to be in there.

Q. So, the formula that should be the basis for the calculation on Exhibit 5 is not the formula that is at the top of Exhibit 5?

A. Right.

Q. The formula on Exhibit 1 in the yellow box --

A. It's missing the molecular weight of the gas.

Q. I see an M in the first set of parentheses on Exhibit 1 in that formula.

A. Right.

Q. But on Exhibit 5 the formula doesn't have an M in it?

A. Right. But, again, it doesn't mean that the calculation is wrong. It's just when they cut and paste from whatever document it was pasted from, that image, that formula was wrong because I do notice in Exhibit 5 molecular weight, M, is shown as a parameter.

Q. Right.

A. But, again, visually looking at -- I just print the document. I cannot determine whether that calculation is done right or not.

Q. They might have plugged in a value for molecular weight of gas, but when they crunched the formula if they followed the formula at the top of Exhibit 5, the calculation would have not have reflected the molecular weight of gas?

A. Right, but, again, on the other hand the actual formula might have taken that into consideration and it's correct.

Q. If the Excel spread sheet did it by itself using the right formula, then it would be captured?

A. Right, right. This is 2nd pass. Um, I would say in general the parameters being used are I would say is good, I mean, the composition, temperatures, pressures are consistent with the 2nd pass exit.

Q. Have you ever seen this particular calculation before, this page reflecting this calculation?

A. This particular page probably not. I'm trying to determine whether -- this was obviously

they had gotten this from Burnside -- whether I got this and modify it and gave it back to Kerry with the correct formula.

Q. You might have received Exhibit 5 and given him the right formula and sent it back, but then do you have a recollection of that, changes of it from 1st pass to 2nd pass only?

A. No. That would be done by him or somebody else. But, again, just looking -- again, without calculating the numbers the process parameters are slightly different, but the big difference is the equivalent diameter of the hole is three times bigger, right?

Q. Oh, okay.

A. And it shows a leakage rate that is almost nine times because it's .0801 pounds per second.

MS. WEINER: Which one are you saying shows the nine times, Exhibit 1 or Exhibit 5?

THE WITNESS: Exhibit 5.

A. Excuse me, let me backtrack a little bit. The equivalent area of the hole is ten times larger. Exhibit 5 is .00323. Exhibit 1 is .00034. So, we have established that the leakage

rate is directly proportional to area. So, you have ten times the area, you have ten times the leakage rate. So, even though the pressures are slightly different, temperatures are slightly different, the biggest impact on the leakage rate is the area.

So, again, without doing all the calculation it's using the right formula. The representation -- the image of that representation on Exhibit 5 is just wrong. Does it make sense?

Q. Yes. So, using the calculation on Exhibit 5 the release duration for Exhibit 5 is --

A. Is different.

Q. -- smaller?

A. Right.

Q. So, the total mass -- if we were going to calculate the total mass for Exhibit 5 based on -- can you tell me how many hours the duration is for Exhibit 5?

A. I just want to make sure it's understood that the formula calculates only leakage rates, pounds per second. So, looking at a consistency

check and neglecting the difference in process conditions the main difference between Exhibit 5 and Exhibit 1 for leakage rate calculation is the equivalent area of the hole. So, if Exhibit 5 was ten times bigger than Exhibit 1, the leakage rate should be about ten times bigger, which it is, .0801 pounds per second versus .0088, leads me to believe that Exhibit 5 used the correct formula. It just cut and pasted a wrong image. So, the next question is what was the duration of that leakage?

Q. Yes, if you can just crunch the number of seconds that is used on page 83.

A. I'll use my calculator because you just locked me out. Actually, I'll use an actual calculator. Exhibit 5 has a duration of 35,496 seconds, which is equivalent to 9.86 hours. Okay, 9.86 hours.

Q. So, on Exhibit 5 using the area of the hole on that exhibit they got a total release in you said about nine hours?

A. Actually, closer to ten, ten hours.

Q. Ten hours, of 318 pounds, is that right?

A. 318 pounds of S03, yes.

Q. One question I had is I see where you are saying the area of the hole in Exhibit 5 where it says A equals area of the hole?

A. Mm-hmm.

Q. That appears to be ten times the A value area of hole on Exhibit 1, but the figure that is beside the line that says equivalent diameter of hole on Exhibit 5 doesn't seem to be ten times bigger than the line that says equivalent diameter hole on Exhibit 1.

A. Because area is proportion to the square of the diameter. So, even if you -- let's say you doubled the diameter, you quadruple the area.

Q. Okay, we should go by the A value, the area of the hole --

A. Right, right.

Q. -- and not by the line that says equivalent?

A. Again, they assume a .77 diameter in calculating the area, but you can do the reverse. I just checked the math and the math is correct. Again, this is not -- twice -- so, you can imagine a small hole you double the diameter, you actually quadruple the area.

Q. Could you maybe just so the record is clear would you mind circling the part of Exhibit 5 that you think is that formula on there and you can just circle that it's missing the M.

A. (Witness complies.)

Q. It appears the calculation was done using the right formula?

A. The formula that is built into the spread sheet that is used for the calculation appears to be correct.

Q. If you looks at Exhibit 5 you see beside that 318 pounds it says, "Note: S03 immediately reacts with H2O." Do you know what field in the spread sheet that would be written in? Is that just a field for comments?

A. It's just a field for comments.

Q. Do you have any idea who wrote that?

A. No. But, again, that's a common -- S03 will react with water to make sulfuric acid mist.

Q. Is it your expertise to determine what the reportable quantity is for a certain chemical under a particular statute?

A. No. Reportable quantity is determined by the statutes. Permits in each state I think is

different. I'm not sure if the federal standardized it for each state.

Q. I'll just show you these and see if you can tell me what these documents are. They're Bates labeled 315 to 318.

MS. BARNEY: We can call it Exhibit 6.

(Chu Deposition Exhibit No. 6 was marked for identification.)

EXAMINATION

BY MS. BARNEY:

Q. First page is 315 and I'm just wondering if you can tell me what that document is.

A. This is a drawing of the converter for Burnside. It's original drawing that reflects a single absorption configuration.

Q. So, that's before they moved to the --

A. Dual absorption.

Q. This really does not reflect the equipment that was in use starting in December 2011?

A. The converter itself is correctly reflected. For example, the ducts that connects the exit of 2nd pass into the 3rd pass and the

exit of the 3rd pass and the 4th pass indicates to me that it was single absorption and that would have been changed; but, the converter itself, the size, the dimensions, are the current one.

Q. Can you maybe just put a mark where you think this document does not reflect the current state of the converter?

A. (Witness complies.)

Q. And the second page, block flow diagram?

A. This is a design to provide a simple representation of the Burnside plant, simple process representation of the Burnside plant, and I drew this. Maybe I shouldn't have admitted that.

Q. No, I like it. The CIP and the HIP and the converter are sort of at the bottom towards the left of the page, right, that's where they're shown?

A. Right. Because it's a simplified -- it's designed to represent the major inlets and outlets of the process, not to truly represent how each line is connected, yes, that's correct.

Q. When do you think you drew this? After

you started working with the Burnside site?

A. Yes, I would say around 2010. I mean, the intention was actually a teaching tool for the new engineer and to the operators. Even though the operators knew how to operate the plant sometimes I will draw this, a simplified drawing, and highlight particular inputs and outputs.

Q. What is the third and fourth pages? Those are pages 317 and 318.

A. The 317 represents three Monplx modules that comprise the CIP and the page 318 consists of the three modules that form the HIP. So, just mechanical drawings showing dimensions, not internals of the heat exchangers.

Q. By the time of your involvement with Burnside did you learn anything about the actual cracks and holes in the equipment?

A. No, not really. Again, those pertain to external leaks. My focus was primarily to help identify the onset of internal leaks.

Q. And you wouldn't have any information about what was done in a recent turnaround, like in September, October, of this year?

A. No.
Q. Other than maybe just talking with people?
A. Other than talking with Percy, yeah. I know they tried to find the leaks and they didn't find them.
Q. And that's even in this most recent turnaround?
A. Yes. But, again, not a lot of details, no.
Q. Just sort of in passing because it's not your job so much?
A. Well, it's not it's not my job. It's hard to determine -- you know, it's just information, Oh, you have a leak. It was nothing I could contribute because even if it's not my job it's still part -- it's a DuPont plant and even Red Lion I had no responsibilities, but the current plant manager used to be operations manager when I was there. So, he calls me and I respond to him as a friend.
Q. And you still care?
A. I still care. I mean, I had gone to Red Lion several times. Even if I care there is not

enough information for me to contribute. So, that's why it's just discussion in passing, checking on Percy, number of hours he is working, and he will relate a few things to me.

Q. And nobody else from DuPont Burnside has called you to get your input into the situation either during the turnaround or after, is that right?

A. 2013?

Q. Right.

A. No.

Q. Has anybody shown you any pictures from the turnaround of cracks or holes in the equipment?

A. No.

Q. If you saw pictures from the turnaround of the equipment and damage to the equipment, would you be able to tell if that was the source of an external leak?

A. If I'm looking at equipment from the outside, yes, I would tell it was an external leak. Sometimes we do internal inspections. I will say that black and white pictures are very hard to do.

Q. Yes, they're really bad. I'll just show you these and see what they mean to you, if anything.

A. With the understanding that I'm not an expert on leaks.

Q. I understand.

A. Visual assessment.

Q. And I don't want you to say anybody you are not confident about. This is DSF numbers 900 to 902. It's an e-mail from --

A. Mark Macha.

Q. -- Mark Macha to Gene Clemons with attaching some photos.

A. Stripped off insulation.

Q. I think this must have been during a repair attempt, I guess. This was right after you left?

A. By May I would have been very little association at Burnside. I'm trying to remember when I went for the last time just to clear my locker and move on. It's hard to -- not only because it's not a color picture, but I can't tell exactly which part of the CIP this picture refers to. He indicates from the e-mail that he

is stripping the insulation to see the external surface of the CIP itself, but because they are close-ups I don't have perspective of which side the heat exchanger it involves.

Q. You can tell that this is the CIP, or, that's the subject?

A. That's the subject. If I look at the pictures without a reference I couldn't even tell you -- well, probably I could tell you it's a Monplx exchanger because it's flat, but I wouldn't be able to tell you which one and even with the reference I don't know the location.

Q. The only thing it would indicate to you I guess is that the insulation was taken off and they don't have insulation on the inside?

A. Right, and, again, because the contrast in black and white too you can't tell whether by discoloration alone which areas are corroded or potentially could be leaking.

Q. If you see sulfates on equipment, what does that tell you?

A. Well, that either there is a leak or there is acid that drip on it. Sulfates by itself, well, you know, are a result of acid

dripping and eventually oxidizing into sulfates, but, where you find it may or may not be the source of where the leak originated.

Q. So, the leak is probably above the place where you find sulfates?

A. Again, generally people that look for leaks look for the signs where fumes come out, sulfates accumulate, holes appear in the insulation. So, you do have color pictures.

Q. I have some.

A. Things like maintenance, doing some maintenance where some acid drip out of pipe and ducts, eventually can lead into formation of sulfates.

Q. I'll ask you to look at this picture and I'll represent to you underneath the 3rd pass duct, but I don't have -- does that look like sulfates associated with a leak to you?

A. Again, it's hard to tell if it's sulfates, wetted insulation or just corrosion flakes from the steel. Again, it's not really -- again, my area of expertise is to not only -- leaks sometimes are obvious, but there are people that can look at discoloration equipment in duct

and say this is the type of leak even by discoloration, the temperature.

Q. Wow. Who can do that at DuPont?

A. Materials.

Q. A metallurgist?

A. A metallurgist, yes, and Burnside uses various, but I know most of the good ones rely on pictures if that's the only thing, but a lot of times they have to visually see a condition, yes.

MS. BARNEY: Let's mark this.

(Chu Deposition Exhibit No. 7 was marked for identification.)

EXAMINATION

BY MS. BARNEY:

Q. Do you remember adding a knockout pot to the end of the CIP coming from the IPAT?

A. Yes, I actually call it a boot. That's what we referenced earlier.

Q. Are you familiar with the forms that DuPont Burnside called an Incident Investigation Report?

A. Yes, I'm familiar with them.

Q. Did you ever have to participate in putting those together at Burnside?

A. No.
Q. That's right, you talked about that, you weren't really asked to participate in that?
A. Right.
Q. You weren't asked, okay, but you did participate in those at Red Lion?
A. Yes. Again, in my role is -- the way incident reports work is either driven at the plant level or at the business level and members of the team are selected based on the expertise needed.
Q. I'll show you two documents. One is Bates labeled DSF15 through 19 and the other one is 20 through 23.

MS. BARNEY: I guess we'll go ahead and mark them so we can talk about them. Number 15 to 19 will be Exhibit 8 and 20 through 23 will be Exhibit 9.

(Chu Deposition Exhibit Numbers 8 and 9, respectively, were marked for identification.)

EXAMINATION

BY MS. BARNEY:

Q. Exhibit 9 has a date on it I believe of August 8th of '11.

A. Mm-hmm.
Q. Wait, Exhibit 9, sorry, has a date of August 8, 2011 and Exhibit 8 has a date of --
A. June 11, 2012.
Q. Have you ever seen an investigation report that had Burnside's name at the top?
A. Yes. Usually any incident report for any of the acid plants, Burnside, Red Lion, they all go to a wide distribution list. So, it is accessible. I can't say that I read all of them.
Q. Do you recall getting any for the Burnside site after June 11, 2012 or would you have no longer been on the list at that point?
A. June 11th -- you say June 11, 2012, right? No, I would no longer have been involved even though technically I was still in ATC.
Q. You probably wouldn't have been on the distribution list after that point?
A. Again, I probably was in the distribution list. I get a bunch of e-mails, I look at the heading and I choose to --
Q. Read or not read?
A. -- read or not read because there are too many. If the incident report comes to Burnside

and says gas leak, chances are I would not have read it because, again, it wasn't pertinent to my role at that time. Usually there would be the author -- usually the team members involved. I just want to make sure I didn't perjure myself. My name is not there.

Q. If you look at Exhibit 9 it seems to have a spot for quantities or amount of release on the first page?

A. Yes.

Q. And if you look at Exhibit 8 it doesn't seem to have that. I was wondering if you knew if the form changed or why that would be?

A. The form looks like it changed. I'm just looking to see what it looks someplace else. Obviously, it has changed from 2011 to 2012, but I don't know why it was changed and why some information was added and omitted.

Q. In order to get the number that would go on a form that looks like Exhibit 9, the one that asks for amount, would they have to do the calculation that we talked about before on Exhibit 1?

A. Hopefully they did a calculation. Again,

whether they used that spread sheet or something similar or any other means I don't know. Looked like they did a calculation. I can't tell what they used.

Q. So, in order to put a number right here they would need to have those same parameters we talked about, area of the hole, duration, pressure?

A. Yes, if they used that formula, yes, they would have to get that information. Again, just by the results I cannot tell whether -- what was the basis of the calculation or what formula was used.

Q. Were you asked or involved in the calculation that is here for August 8th of 2011? I think you may have already answered that by saying you never did any of those at Burnside, but I just want to be sure because you were involved with them at that time.

A. My answer would be not that I recall. I mean, a lot of calculations -- again, usually if it's a calculation that I do I will provide in written form with an e-mail so that -- again, so that we have a paper trail so that if somebody

looks at the incident report and say, well, what was the basis, we wouldn't have to guess the way we are trying to do now.

But, again, to the best of my recollection I wasn't involved in this calculation and there are standard forms that the plant could have used.

Q. To do the calculations?

A. To do the calculations.

Q. What form is that? Is that the form we were talking about on Exhibit 1?

A. Right, the two exhibits, the one that --

Q. Exhibit 1 and Exhibit 5?

A. Right.

Q. If somebody at Burnside did the calculations that we talked about on Exhibit 1 and 5, those would be saved on the computer somewhere? Would that be the normal protocol?

A. It would be normal for me. Some people don't like to save anything. Some people -- but, the best way I can answer is for a calculation like this where the interest is just a summary we either have or should have hard copies or electronic copies that you can insert as an

attachment, again, to show what was the basis, you know. A calculation is just an arithmetic exercise. That's not the important part.

The important part is what assumptions were used to arrive at the calculation. So, it's best to document it. I'm okay being wrong, but I don't want to distract the fact that what I don't remember. So, again, I can't tell what kind of calculation and what parameters were used.

Q. If there were attachments inserted into this document, Exhibit 9, would it be listed under preliminary attachments? Would that be reflected on this report?

A. Yes, it would be reflected. You will see a little icon that says preliminary attachments on Exhibit 9. There will be a little icon that says a file was inserted there.

Q. And there aren't any reflected here on page 20 of Exhibit 9?

A. Right, no.

Q. On page 20 of Exhibit 9 there is -- it says chemical release and then it lists two types of gas, right?

A. Yes.
Q. And under the amount released it only lists one number?
A. Right.
Q. If you were doing that spread sheet we talked about there should be two numbers, right, one for each gas?
A. Yes, unless they totaled it. Right, the calculation will discern two numbers whether the amount reported or released reflects the sum of those two.
Q. So, we just don't know I guess here whether that was --
A. Yeah, I can't tell.
Q. This doesn't tell you the size of the leak source, right, nothing on this page?
A. No.
Q. But it does indicate a duration?
A. Yes, 315 minutes.
Q. Then, with the form that is dated June 11th, which is Exhibit 8, this form discusses a gas leak from the CIP doesn't capture the amount released -- I see now there is a place for it down at the bottom of page 15 it says

amount released?
A. Yes.
Q. But it's just left blank?
A. Yes.
Q. Normally -- let's see if this says it's final. Can you tell from the last page? It says complete issued?
A. The signature when it was drafted on June 11, 2012 he has the progress, I would assert that there would be a date for complete and a date for the incident issue. That would be the normal. Even though it says final maybe -- again, I don't know all the procedures whether they -- but if it's complete in issue category and it has a date in it, I would expect somebody to say, okay, this is final and then the very next step is it's complete and it was issued for review like for the wide distribution list like myself a particular date.
Q. So, we have it showing final from the plant manager, but we don't have a date for when it may have gone to the distribution if it did?
A. Right.
Q. Does this one show any attachment such as

any spread sheet?

A. Let's see the date. Not that I can tell. If you look at for both documents under status edit tracking it shows the dates that they were updated and ready to be issued. So, again, I can't tell from this whether it officially issued or there was another revision; but, as far as that document it was updated to be ready to be issued.

Q. Normally when you saw final investigation reports were the blanks filled in for things like amounts released out of primary container?

A. Normally, yes. I mean, that's a key category to determine whether the release is reportable, whether it was or was not, at least there should be a basis for that.

Q. If you look on page 17 it says environmental rating C, but they would need to know the amount released in order to arrive at that rating, right?

A. Again, on page 16 --

Q. I'm sorry, 17.

A. Okay, but I'm referring to page 16 environmental rating, line two, Actual size of

release, incident or magnitude of event, Small release bigger than .45 kilograms, less than 4.5 kilograms. Again, I can't tell if this is an example or the determination. The calculation even though it's not shown fell between that category and, therefore, because it put the environmental rating with zero points, which indicated very small release.

I do agree with you that the amount of release is not stated, duration is not stated in Exhibit 8, but I can't explain why it was not included.

Q. If you look on page 15, Bates page 15, it says the gas leak was traveling in the 5 and 6 tankcar rack area and we shut down tankcar activity. For a leak that travels across the site and requires clearing out a work area would you expect to see a spread sheet done on the quantity of the release?

A. I would expect the calculation if the parameter is available allow for the calculation, right. This is a CIP gas leak, so, it would have come from the duct or the external housing of the heat exchange. There would have been enough

parameters to estimate the leak.

Q. You mean because they could go get access to the leak source by lifting up the insulation?

A. Yeah. I mean, if it was a leak -- again, even if the leak is small, you know, even by estimating the -- by lifting the insulation and seeing it or because this is from the CIP and it doesn't tell me which part of the CIP is leaking. They can visually gauge the magnitude of a leak based on the fumes, visible fumes.

They can still come up with an estimate, so, they would have somehow come out with an estimate, whether it's calculation or just educated guess, to ascertain the magnitude, small, medium or large.

Q. If you are not there in June of 2012 to do an estimate, kind of a rough estimate I guess on just visual appearance, then who would be qualified to do that at Burnside in June 2012, if you know?

A. Dan Monhollen, Elizabeth, Tom. It's a spread sheet.

Q. The calculation?

A. Right, it's just a spread sheet. They

can get the process data from the DCS. They can get -- again, that's why the incident investigation there will be discussions of size of leaks based on the expected hole size or -- I mean, if fumes get released, the duration.

Q. To accurately do it they have to do the spread sheet calculation that we talked about earlier and actually have an estimate of the area of the hole and that sort of thing?

A. Again, the accuracy can be debatable, but it's the basis that one uses, again, understanding the uncertainty, if not duration, the size of the hole. I don't associate calculations with -- just because one can calculate it and arrive at a particular number that is accurate, but at least in the calculation all the assumptions are put in place rather than somebody just saying, looking, recollecting, and saying I think that was 1.1 kilograms that escaped. I don't know that anybody can do that.

Q. Do you recall being asked in May of 2012 -- so that would have been sort of when you were transitioning out of Burnside -- for any information that Burnside might have needed to

respond to an OSHA inquiry?

A. No, i don't recollect anything like that.

Q. I guess I'll show you a document that we can mark as the next exhibit. That's an e-mail from Jeff Simoneaux to Elizabeth Cromwell back on February 1st. I think that was the incident we were talking about earlier. I'll ask you just to read that e-mail, if you would.

(Chu Deposition Exhibit No. 10 was marked for identification.)

EXAMINATION

BY MS. BARNEY:

Q. Did anybody forward that e-mail to you do you recall?

A. No.

Q. In your experience do you think if an operator had concerns like these that he should be sending them to his supervisor?

A. I think that's his job. Normally it would not require an e-mail. You would normally pick up the phone and go down the hole or whatever and communicate this information.

Q. Did you come to learn in your time at Burnside that Elizabeth Cromwell didn't always

return phone calls?

A. Yes.

Q. So, if telephone wasn't the quickest communication, then an e-mail in your experience would have been appropriate?

A. Yes. An e-mail is a way to document that a communication went through or there is not much trust between two people.

Q. So, at this time period there was some I guess issues about operators feeling like they had to document things with management?

A. I'll say before that.

Q. Did you think there was some justification in that with the operators' concerns?

A. Yes.

Q. If there is some formal report that DuPont would like to have filled out like an initial incident report in your experience at Red Lion or otherwise would it be a problem for the operator to send an e-mail and do a formal report if the supervisor wanted a formal report? Let me -- I'll try to rephrase it.

There has been discussion about you

have to do a first report or initial report and I guess my question is is there anything wrong as far as you know in your experience at DuPont with sending an e-mail and doing a formal report?

A. I don't see it as wrong. It's unusual.

Q. You think going to the step of a formal report right away would be unusual?

A. I mean, the incident report is normal. An incident report is initiated shortly after the incident is discovered and that document is left open until all the available information is gathered, analyzed and documented before finalizing it. So, the incident report is a formal report that is normal. Sending an e-mail documenting operational maintenance issue is unusual.

Q. You mean DuPont-wide it's a little unusual to --

A. Well, I don't know about DuPont-wide. In my experience it's unusual. I can't speak about all DuPont. I look at least at this specific topic on Exhibit 10, you know, is highly unusual to have to document in e-mail. Now, e-mail is not a formal document, but document in e-mail the

fact that an operator had communicated information to his immediate supervision.

Q. And it was because of some distrust or tension between management and operators?

A. Again, that would be my impression that just between Jeff and Elizabeth, but, you know.

Q. So, at Burnside there was like you said this justification for the operators to document what they were saying to management from time to time?

MS. WEINER: What she is asking for is your opinion.

MS. BARNEY: Well, or perception I guess.

A. Yes, I think they would be justified in doing that, yes.

Q. Have you seen S03 gas leaks coming from operating or process equipment before?

A. Yes.

Q. So, you kind of know how they look?

A. Right. Particularly since I now support operations in China, Morocco, Chili.

Q. Let me see if I can show you a video on here. I'm not sure how great this will be with

my technology efforts. This should be -- I'm trying to pull it up. There are several things on the CD, which may make it a problem for attaching it as an exhibit if I don't use all of them.

You are looking at a video at this time. This is actually a video of camera 13 at DuPont Burnside, which I think is focused on the converter. So, my question would be whether in viewing this video you can see S03 leaking?

A. I'll say most likely, yes. This is a converter and the top section is the 1st pass and the exit of the 1st pass which, again, not knowing the exact location, but that would generally be where the 1st pass exit would have S03, but I can tell you from -- so, S03 release looks like a steam leak. So, visually I cannot tell whether it's S03 or steam.

If I was there at the time the circumstances I'm describing and the release is exiting the 1st pass outlet, it can only be S03. So, I don't know if that answers your question, but visually, no, I don't have the eyes that can discern molecular weight; but, if it's coming out

from the outlet duct of the 1st pass, the only possible gas component that is released that will have that kind of appearance is S03.

Q. And if Mr. Simoneaux testifies that he took this video and that he saw that to be a S03 leak, would you have any reason to dispute that?

A. No. I know Jeff well enough that I would not dispute that.

Q. And if Percy Bell thought it was S03, you wouldn't dispute that either, right?

A. If Percy tells me that, I would not dispute that at all because they will not just show me the video, they will give me some background information that would tell me -- from this angle I can't tell. They would have told me it's coming out of the duct because from this angle you can imagine -- there isn't, but if there are steam pipes leaking and they say what is that, I wouldn't be able to tell. Percy or Jeff, Percy in particular, I would not have any problems trusting their information.

Q. Sometimes if there is a steam release going on at the same time as an S03 you might be able to differentiate the steam from the S03, but

if you are just looking at one cloud --

A. Yes.

Q. -- sometimes it's hard to tell, is that right?

A. Right, right.

Q. Because steam will dissipate quicker and it won't hang around as long?

A. And depending on the steam leak is a little more energetic, right, because the steam lines are a higher pressure and I don't know of any steam pipes running that close to the converter. Again, it's easy to check. I mean, the operators have cameras especially at night to be able to monitor the plant because usually it's only two people there. These are cameras also for safety. The field operators are there to monitor what he is doing so that he is safe.

If they see something like that, their first reaction is not assume it's a leak. They see a leak and they send the operator to verify where the leak is coming from.

Q. Mr. Chu, were you involved in any particular discussions about shutting down the plant to fix the leaking equipment?

A. Specifically the CIP and HIP?
Q. Yes, or the converter.
A. Well, I was involved in requesting to shut down the plant when they have converter leak -- excuse me, converter waste heat boiler leaks. That's when we have an internal leak of water that is used to generate steam as a co-product of the process and a couple occasions when they had a boiler leak and it's leaking water internally into the process, yeah, I told them they need to shut down. Elizabeth and Gene were trying to figure out if there is other explanation that would result in what we were seeing of the condition in the plant and I said, No, this converter was boiling, you need to shut down now, but not specifically on CIP and HIP.
Q. When was that that you had that conversation about the boiler?
A. Probably 2010, towards the end of 2010 I think.
Q. Was Tom Miller already the plant manager at that point?
A. No. He was turnaround 2011.
Q. So, Don Janezic was the manager then?

A. Yes.
Q. Do you recall whether they shut down like you recommended?
A. Yes.
Q. They did?
A. Yes.
Q. Before you transitioned out of the role where you were involved with Burnside did you have the occasion to recommend that they shut down the plant before you left in order to make any other repairs?
A. No, not that I can recall. I mean, boiler leaks in my mind were major ones, so. The reason I remember is I was having dinner in Baton Rouge with my brother and I got called about a boiler, potential boiler leak, that they just repaired. So, I had to go back to the plant and look at the information and say, yeah, it's a boiler leak and shut down now. The dates, 2010, 2011, sometimes it's a blur those years, but I was still the converter waste boiler leaks I would have been responsible for them for the plant.
Q. I'll show you one more video. I'm

showing you a video that is dated October 27, 2013. And I ask you just to look at this one for me. If you need to turn it, feel free. For the record Mr. Simoneaux would testify that this was taken by him outside on River Road or on the levy or in the parking lot next door. I think he moves around during his video.

A. Was this during the turnaround?

Q. I think the testimony has been that they started back up after the shut down on this day, on October 27th, that they just restarted. If you look at marker one, colon 51, and stop it for a second does it appear at that point in the video where you can see a steam source and you can see it behaving a little differently than another gas source? Just tell me if you agree with that.

A. That steam source dissipates easily. The other one is something else. I mean, I can't really -- all I can say is that it's unusual.

Q. It's a lot of -- whatever it is it's a lot?

A. Right, I don't know what it is, but it's unusual.

MS. WEINER: Would this be unusual if they were just restarting plant operations that he was videoing it?

THE WITNESS: Well, if they just restarted it then the source of this kind of fumes it would be at the stack level, not around the plant.

EXAMINATION

BY MS. BARNEY:

Q. And you are seeing it around the plant?

A. I'm seeing it around the plant. Were there other plant cameras that they were to provide different angles?

Q. I think there are, I'm not sure how good they depict.

A. Usually in the plant start-up because of the type of plant Burnside is it starts up as a sulfur burning plant they're initially putting sulfur feed on. There will be a short period of time where the stack, which is this one here --

Q. Let's stop it right here. We are talking about marker 350 that is right above that tree?

A. Right, right. There may be an initial plume and soon after the plant starts heating up

and coming up to rates, it will dissipate; but, coming out from the area that surrounds the converter -- I can't tell if it's converter or gas heat exchanger area. That is unusual.

Q. And you are referring to the area to the left of the tree?

A. Right.

Q. And lower than the stack?

A. Right. I'll call that unusual and -- but I can't determine what it is from just looking at it.

Q. If Mr. Simoneaux testified that he believed that to be S03 gas, would you have any reason to dispute that if he is physically on the parameter?

A. I can't dispute that he believes it. I'm not saying that it's not, but, again, I can't -- I will say even if it's S03 I'm not sure where it's coming from and how bad it is and why it's allowed to continue if it is, in fact, S03 because that's a significant amount and almost at ground level. Because that starts affecting people that are in the general area as opposed to dissipating at some altitude.

I will also say that I don't have a lot of experience with big S03 leaks. It's not something normal that is allowed in an acid plant.

Q. So, if that is S03, that's disturbing to you?

A. Yes. It would be, particularly if I have to work there or live around there. I would say with a release like that there would be notice to some surrounding community complaints depending on the wind direction. It's a different angle.

Q. If Mr. Simoneaux testified that he talked with some people at the neighboring facility who said their throat was irritated and eyes were irritated, would that be consistent with the kind of outcome you would expect with a leak like that?

MS. WEINER: I just object to the extent it calls for expertise outside of his area, but you can answer it, if you know.

A. Yes, S03 would cause irritation to the throat and eyes.

Q. It's not your testimony that this is not S03 gas on the video, you are just not sure?

A. Yes, I'm just not sure. Even if it's S03, suspected as S03, that would be pretty disturbing to me. Can I ask what was the duration of it?

Q. I believe -- well, I believe the evidence is that the plant was shut -- rates were cut back at some point and I believe the police were called and the rates were cut back I believe is the testimony that has been given.

MS. WEINER: But we don't have an absolute -- I don't think we have a time that we know at this point.

THE WITNESS: That the rates were shut down?

MS. WEINER: I thought you were asking the duration that looked like that and I don't know that we have that in terms of hours.

THE WITNESS: But shortly after that --

EXAMINATION

BY MS. BARNEY:

Q. The testimony is Mr. Simoneaux called the police and that eventually a policeman came out and eventually DuPont was called and after the

police called DuPont the rates were cut back at the plant.

MS. WEINER: That's according to Mr. Simoneaux.

MS. BARNEY: Yes.

A. After the rates cut down whether that got reduced?

Q. There is a video for the next evening that I might be able to show you.

MS. WEINER: I think the next video was October 31st, right? The one we don't have.

MS. BARNEY: But you do have the 28th, next night.

THE WITNESS: That's why I mentioned earlier that it's hard to determine how well the plant is running just by looking at data in the historian. Things like that is not recorded and the historian to look back. That's why we have operators, maintenance folks, to look.

EXAMINATION

BY MS. BARNEY:

Q. Whoever was there that night should have been aware of that situation and done something about it before a call from the police?

A. Yes. Yes.
Q. I'll show you a video from October 28th.
MS. BARNEY: Which you do have, Monique. The October 31st I don't have even have off of the camera.
EXAMINATION
BY MS. BARNEY:
Q. I believe this is October 28th. Now you are looking at a video from October 28, 2013. You still see some white vapor, but does it appear to be not as much?
A. It's hard to gauge, but regardless of what I see in the video what does the plant logbooks show us as an explanation for that because that's not normal? I do agree with the assessment that if it's just steam it dissipates a lot quicker. That tends to linger. Whether that's S03 or smoke or something it's lingering a lot longer than just steam vapor, but I would expect that this -- again, at night it's more visible because we have reflection of the lights against the dark sky, but in the daytime that would not be visible either.
Q. But the way that white fume material is

looking is consistent with S03 gas, but you are not going to be in a position to say that it is S03 gas?

A. Right, regardless what it is if I'm at the plant or anybody is at the plant there would be some record or something that -- to explain that. I mean, you know, dust particles can do that too, but it's kind of disturbing. You can see how this dissipates a lot quicker.

Q. You are pointing to the steam area.

A. Right.

Q. You can tell the difference between the steam and the other material?

A. Yes. I guess I'm not the first -- well, there has only been -- what is this, December? I'm not the first one to see that in a deposition?

MS. WEINER: No, you are not.

Q. Maybe October 28th you are, but not October 27th.

A. And this is 2013, right?

MS. WEINER: Yes.

Q. Yes. And that was after a shutdown to try to find the source of the leaks, which I

believe you testified you heard from Percy Bell that they weren't able to find all the leaks?

A. Yes.

Q. With the fuming looking appearance that you saw on the October 27th video and the October 28th video would you expect there to be a full investigation of what that is and -- I'll stop there. Would you expect there to be a full investigation of what that is?

A. Yes.

Q. Would you expect as part of that that they would run a calculation if they found a leak source?

A. Yes.

Q. Would you expect that they would not crank up again until they found the leak source if there were a leak?

A. Would I expect that they would or shouldn't?

Q. Would not crank back up or should not crank back up.

A. I would expect that they should not. I would expect they should not crank up unless they can control it.

Q. I think we touched on this earlier, but the hose and the box vacuum system -- let me start over. The hose apparatus that Burnside has attached to the leaking equipment that's not part of the engineered design of how the plant is supposed to operate, right?

A. That's correct. You are talking about the black hose part, right?

Q. Right.

A. Part of the manifold system that is connected to the dry tower to control fields from pump tanks, which Burnside has, is part of the system.

Q. The vacuum part?

A. Right. Again, the dry tower is a vessel that has probably the lowest pressure, so, the highest vacuum. So, it's used to -- manifolds are designed to suck off gases from process equipment. The corrugated hoses are not part of the design.

Q. That apparatus is just sort of attached to a vacuum system?

A. Right.

Q. And the vacuum system has an engineered

design purpose and it is kind of borrowed and attached to the hose material, which the hose material is not part of the engineered design?

A. Right, the hose's specific purpose, let's say, in this application is to control the gas leak and plants are not -- even though they expect to have gas leaks you don't design a system to -- just for the gas leaks. It was extended, that system was extended towards this application.

Q. During your involvement with the Burnside site did you ever become aware that DuPont had reported any of the gas leaks from the CIP, the HIP, the converter the super heater or any of their duct work to EPA or DEQ?

A. Mainly hearsay. Again, I knew they were supposed to be reporting it. Do I look at the reports? No. No.

Q. If the testimony has been that they have not been reporting it, do you think one reason for that is that they don't want to pay the fines that might go along with reporting it?

MS. WEINER: I'll object to the extent it calls for speculation. You can answer

if you know.

A. I don't know.

Q. Wasn't it your impression when you were down at Burnside that that was part of the motivation behind not reporting?

MS. WEINER: Same objection.

A. Again, whether reporting or not for whatever reason, whether it's fines, sometimes it would be -- the reason may be as simple as not making the plant look bad by having this many problems, right? Because an incident report is a document and it's part of a benchmark to compare other plants and, of course, the plants that have least amount of reports look better. Again, a speculation as to the reason why they would do -- whether they report or not.

Q. If during a dinner conversation back in spring 2012 you mentioned that DuPont wasn't reporting these leaks because they didn't want to pay a fine of $25,000.00 a day, could it be that you just don't remember saying that?

A. It could be I couldn't remember saying that.

Q. But you may have said that?

A. I may have said that.
Q. If any operators at the plant remember that, you wouldn't dispute it?
A. Depends on which operator tells me that. Even if I said it it would be a speculation at that time as to why. I don't attempt to understand the mentality of management.
Q. It may have been just a personal impression that you got?
A. Yeah. It all depends if I knew that it was reportable. Based on my calculation, my estimate, it would have been incumbent on me to report it, not necessarily to the EPA, but to my management, which is now I don't report to the plant.
Q. But you were never given the size of the holes and cracks that were in these vessels for you to make that determination, right?
A. Right, right. I can determine all the process parameters, but the key parameters that's a whole different issue that I believe can be arrived at only based on discussions and a consensus.
Q. So, if the operators that were at that

dinner included Mr. Rapp or Mr. Simoneaux, would you dispute the accuracy of their recollections what you said about the fines?

A. Again, I wouldn't dispute it, but I really don't recollect specifically saying it's because of a $25,000.00 fine. It might be a statement that I made and they recollect correctly, but I also don't find any reason for them to make that up.

Q. I guess in your experience there could be fines if you release S03?

A. Well, this reportable quantity that is associated -- again, not just necessarily fines, but there is internal ratings, classifications of environmental events, doesn't reflect very well on the plant management if they have categories of release that are reportable.

Q. Are you familiar with TSCA, that particular environmental statute?

A. I heard of it. I mean, I'm aware, yes.

Q. Do you know whether TSCA has a quantity that triggers obligations under TSCA?

A. I know that there are quantities that trigger. I don't know exactly what the

quantities are for specific compounds. I guess you are referring to acid mist and S03 or S02.

Q. I guess my question is I realize there are reportable quantities under various environmental statutes, but do you know for sure whether -- maybe it's a legal question, but do you have an understanding as to whether there is a specific reportable quantity under the TSCA statute?

A. I know there is specific quantity. I don't know what the quantity is.

MS. WEINER: You mean you know there is a specific quantity, but you don't know what it is?

THE WITNESS: What the number is.

EXAMINATION

BY MS. BARNEY:

Q. And you think that that quantity correlates to the specific legal statute for TSCA notification?

A. Yes.

Q. That's how you -- whatever training you have had on environmental issues that's your understanding that there is something in the TSCA

statute that has a quantity?
A. Mm-hmm, yes, either quantity or concentration.
Q. Other than your college education and your job at Mittelhauser have you had any environmental experience outside of working at DuPont?
A. Even at Mittelhauser my role was not on environmental.
Q. That's true, let me strike that and start over. Have you had any environmental education or training outside of DuPont?
A. Hazardous waste classification. I mean, that would be considered environmental, yes.
Q. Where did you have that training? At Conoco?
A. I think probably Mittelhauser and also Conoco because we had to deal with hazardous waste management for exploration and production.
Q. Can you think of any other environmental training that you have had other than at DuPont?
A. Not that I recall.
Q. In any of your experience at DuPont have you ever heard a plant manager discouraging

employees from calling authorities about gas leaks or any other environmental problem?

A. Yes, Burnside.

Q. Tell me about that.

A. Well, again, this is from what the operators will tell me, not as an official policy that the plant manager would go out and say don't call.

Q. You heard from the operators at Burnside that the plant manager was discouraging people from calling the outside authorities?

A. Yes.

Q. I guess you didn't have any involvement or did you with T. J. Ozbun at the Burnside site?

A. What do you mean by involvement?

Q. He is now the environmental coordinator, but I don't think he had that role when you were there, did he?

A. No. We have offices in the same trailer, but not really any day-to-day interactions.

Q. I guess you did have interaction with Kerry Long when he was the environmental person, we talked about him.

A. Mm-hmm.

Q. We talked about the time he asked you for advice to make sure he had the parameters for some of those calculations. Is there any other interaction that you recall having with Mr. Long?

A. Yeah, in one of the exhibits, which was to estimate acid that leak out of the pump tank.

Q. That was your Exhibit 2 that I think you brought with you, is that right?

MS. WEINER: Right.

Q. Here you go.

A. Right. I was asked by somebody in Wilmington to check the original estimate for the acid leak as a result of -- that resulted in a pH excretion into the river. So, I had to ask Kerry how they estimated it and then I revised their estimate based on the DCS data and talking to -- with the people that were at the site that had knowledge of the incident. But, again, I wasn't part of the incident investigation. Just as I'll say an additional source to recalculate what the range of acid that could have leaked into the river.

Q. Before you got involved -- well, strike that. Who had done the first estimate?

A. Kerry.
Q. And, so, somebody at corporate asked you to double-check the estimate?
A. Right.
Q. Who at corporate asked you to double-check?
A. Maureen Miller.
Q. What is her role?
A. I forget what her current role is. At that time she was safety, health and environment manager I think for the acid circuit, but she also the first time I met her years back she was an environmental specialist at Burnside.
Q. When you double-checked the estimate, did you come up with a higher range or a lower range than the Burnside folks, Mr. Long, had come up with?
A. A higher range.
Q. Did Mr. Long tell you how he arrived at his estimate?
A. Yes.
Q. And how had he done that?
A. He looked at the ground and came up with a number, which is the reason I was asked to look

into it.

Q. Did Mr. Long give any explanation for why he just looked at the ground and did a number?

A. I did not ask.

Q. Did you get the impression in dealing with Mr. Long that he was under some pressure to keep the numbers low?

A. No.

Q. You didn't receive that impression?

A. From talking to him, no.

Q. Do you know why he left DuPont Burnside?

A. No, I don't know. I think he went to a different company or something, but, again, I have no animosity. We just didn't interact that much. He is not a very sociable person, so, you know, I just wasn't interested.

Q. Do you know whether Maureen Miller has any information about the hose system or the leaks at the Burnside plant?

A. I don't know, yeah, I wouldn't know.

Q. When you were involved with Burnside, was there a person, Matt Barnes, who was in the environmental group?

A. Yes.

Q. What was his role in connection with Burnside? I know he wasn't at Burnside.

A. I think he took over Maureen's role. Matt used to work for Maureen. Again, the titles over the years escape me. I knew at one point I first met Matt at Red Lion.

Q. When is the first time you met Tom Miller?

A. Turnaround of 2011, April. Could be March.

Q. The calculations that we have talked about earlier, Exhibit -- I won't repeat the numbers, I'll never get it right -- the calculation formulas that we were talking about, those would not measure the amount of gas in the hose system, right?

A. You mean the hose that is used to --

Q. Try to suck up the leaks.

A. No. It measures the gas that has potentially been sucked into the hose. So, the calculations are designed to see what is leaked out of the hole.

Q. Out of the hole?

A. Yes. It doesn't calculate the efficiency

by which the hose is sucking or containing the leak.

Q. If the hose is capturing some of the gas if the hose melts down, then that gas escapes, right?

A. No. If the hose melts, then it reduces the efficiency of the suction. So, whatever is in the hose is already gone into the system, into the dry tower. So, if it melts now you have a larger opening, so, the hose system is trying to suck more air out of a bigger opening. Therefore, it reduces the effectiveness of trying to localize that hole right at the leak.

Q. So, more of the gas may get away and not be sucked up by the hose?

A. Right.

Q. When the hoses melt, is that sometimes a product of acid building up in the hose?

A. That is one component. The other component is depending on where the leak is some of those gases exiting could be 400 to 600 degrees C. So, part of the reason it's melting is being it's sucking fairly hot gas. So, melting by itself depending on the type it

could be the temperature of the gas itself or the fact that acid is being formed because S03 is reacting with water and releasing more energy localizing the heating even more.

Q. When the acid builds up that affects the vacuum, right, are you familiar with that, that if acid fills up in a section of the hose, then they lose vacuum or are you not familiar enough with that apparatus to know?

A. Well, the hose filling up with acid or any kind of liquid would not affect the vacuum. It may affect the effectiveness of the suction.

Q. Okay, I worded that wrong.

A. But I understood I think what you are driving at. Any way that restricts the hose, position, size, will affect the effectiveness of trying to control the gas leak.

Q. And depending on how effective the vacuum is being when the hose melts would determine how much gas is in the hose and released when it melts, is that right?

A. Like I said, essentially once the gas is in the hose -- let's say you have gas in the hose and all of a sudden the bottom section primarily

is going to be at the inlet, not in the middle, melts, whatever gas is in the hose is going to be sucked. Now, the new gas that is sucked that concentration will vary. The effectiveness at a time after it melts is compromised, but once it's in the hose unless the hose ruptures before it goes into the manifold, before it goes into the dry tower, once it's in the hose --

Q. It should go back into the process?

A. It should go into the process.

Q. But the leak source at that point is not contained as much as --

A. Contained, right, right.

Q. And these connections between where the hose is positioned at the leak those are not airtight connections, right, as far as you know?

A. There are two types. Ones that they can put the hose right next to an area and other times they try to build a box, let's say, a hood by which most of the gas is contained in that box and they use the hose to suck it. I don't know which method they used.

Q. If the contractor who is trying to capture the gas with this hose system says that

it doesn't get all the gas, would you disagree with him?

A. I would not disagree with that statement.

MS. BARNEY: I think that's all I have.

MS. WEINER: I'm going to ask just a few questions just to clarify a few things, but I think we are getting close to being done.

EXAMINATION

BY MS. WEINER:

Q. Getting back to the questions that Ms. Barney asked you about the plant reporting any of the leaks from the CIP or the HIP or the converter you said that you knew they were supposed to be reporting. Did you mean reporting to outside regulatory agencies or reporting internally within DuPont?

A. Reporting internally with DuPont. That's the primary criteria, you report internally and based on that determine whether it's reported externally.

Q. As you sit here today do you have any information based on what you have seen, what you talked to operators about or calculations that

you believe Burnside has exceeded reportable quantities for S03 such that they should have reported to regulatory agencies?

A. I have no information to say that they have not reported what is supposed to be reported.

Q. Ms. Barney asked you after you watched that first video, the 10/27 video, which was the one when the plant had started up that day, and she asked you if something should have been done about that before the police were called, something done about that at the plant before the police were called by Mr. Simoneaux. You said, Yes, I would think so. That would be assuming that it was an S03 release, right?

A. Right. And, again, it's also assuming that they probably were doing something to control it. From the video you can't tell that nothing was done.

Q. Other than seeing these videos have you ever seen personally an S03 leak at the Burnside plant from the CIP, the HIP or the converter?

A. Yes, but not at this magnitude. I've seen small leaks that at the time appeared to be

controlled by the hose, but I've seen fairly large leaks outside the plant. So, I have a gauge as to what leaks are supposed to look like and not supposed to happen in acid plants.

Q. The leaks that you have seen at the Burnside plant those were not ones that you thought required any reporting to outside regulatory agencies?

A. I have no way to determine that. I see leaks, leaks are supposed to be, again, internally documented and then determined whether they're reportable or not.

Q. And you don't make that determination as to whether they're reportable or not?

A. I don't make that determination. But I would add that if you need a hose system to contain it it's because there is enough that could be calculated and then from that determine whether it's reportable or not. You just don't put a hose to every single leak that you see.

Q. While you were assigned to Burnside from first quarter 2010 to first quarter 2012, that two-year period, were you aware that the plant had ever done any shutdowns to fix some of those

holes or cracks or leaks that were causing the emissions?

A. Yes.

Q. Do you know if they were successful in fixing some of the leaks and cracks?

A. They were successful in fixing some of the leaks.

Q. And then potentially others would develop so they may have continued to have problems, but they did go in and fix some of them?

A. Again, I don't know the number. That would be something that would be documented by maintenance records that there will be leaks that are successfully repaired, but they could develop later on in the process and they have to fix again. There would be leaks that they were unsuccessful to repair the first, the second time, and they tried to contain it and then repaired at a later time. So, it's a number. The success rates I don't know.

MS. WEINER: I think that's all I have. Thank you.

MS. BARNEY: Just one follow-up.

EXAMINATION

BY MS. BARNEY:

Q. You haven't seen enough documentation on the size of the holes and cracks and the leaking equipment to support any kind of calculations by DuPont as to whether the leaks have been reportable quantities, right? I'll just strike that. I think what I'm trying to ask you is that without having -- your testimony or I think everybody is understanding is they still haven't found all the leaks. So, without knowing the size and number of the holes and cracks in the leaking equipment as far as you can tell there is not the basic information that DuPont would need in order to know how much gas is leaking in order to quantify it, right?

A. Correct. Just like -- again, the calculation establishes the potential leak based on the information. How much is contained by the hose, how much escapes, how much is unaccountable for, again, is very uncertain.

Q. When you were out at Burnside, were you out at night a lot at the plant?

A. Generally, if I come at night and I do

visit the operators at night I will go out to look for -- to check some processes, the towers; but, generally when I go out at night, it's just to visit with the operators. Now, if they invariably ask me to go out to look at something, and I can't remember a specific situation, they want me to check on something, I usually go with them. Again, that's what I like to establish with the operators in the field that I tell them if you see something that is unusual, let me know because there is things that I cannot see by just looking at a computer screen or from a thousand miles away.

MS. BARNEY: I think that's all I have. Please attach the October 28th video as Chu 11.

(Chu Deposition Exhibit No. 11 was marked for identification.)

(The deposition was concluded at 4:48 p.m.)

I N D E X

DEPONENT: Luis Chu	PAGE
Examination by Ms. Barney	2, 185
Examination by Ms. Weiner	181

E X H I B I T S

CHU DEPOSITION EXHIBITS		MARKED
Exhibit 1	One sheet of calculations prepared by Luis Chu	56
Exhibit 2	Multi-page document entitled "Preliminary Conclusions"	56
Exhibit 3	Document Bates stamped DSF618 through DSF634	73
Exhibit 4	Document Bates stamped DSF866 through DSF874	74
Exhibit 5	Document Bates stamped DSF0000083	118
Exhibit 6	Document Bates stamped DSF0000315 through DSF0000318	127
Exhibit 7	Document Bates stamped DSF0000900 through DSF0000902	135

E X H I B I T S (Continued)

CHU DEPOSITION EXHIBITS		MARKED
Exhibit 8	Document Bates stamped DSF0000015 through DSF0000019	136
Exhibit 9	Document Bates stamped DSF0000020 through DSF0000023	136
Exhibit 10	E-mail, dated, 2/1/12, to Elizabeth M. Cromwell from Jeff M. Simoneaux	148
Exhibit 11	CD, October 28, 2013	186

DIRECTIONS NOT TO ANSWER	PAGE	LINE
NONE		

REQUESTS MADE FOR DOCUMENTS	PAGE	LINE
NONE		

ERRATA SHEET/DEPONENT'S SIGNATURE PAGE 190

CERTIFICATE OF REPORTER PAGE 191

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CERTIFICATE OF REPORTER

I, Christina M. Vitale, Certified Court Reporter and Notary Public, do hereby certify that there came before me on Friday, December 6, 2013, the deponent herein, LUIS CHU, who was duly sworn by me and thereafter examined by counsel for the respective parties; that the questions asked of said deponent and the answers given were taken down by me in Stenotype notes and thereafter transcribed by use of computer-aided transcription and computer printer under my direction.

I further certify that the foregoing is a true and correct transcript of the testimony given at said examination of said witness.

I further certify that I am not counsel, attorney, or relative of either party, or otherwise interested in the event of this suit.

Christina M. Vitale, CCR

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$25,000.00 (2) 168:20 170:6

A

aback (1) 94:10
ability (2) 4:21 83:3
able (32) 17:13 18:10 20:17 28:18 30:4 36:12 46:1,5 56:7 57:14,18 66:23 67:10 77:20 78:21, 23 88:3 96:4, 8,8 100:12,15 104:16 108:19 117:18 131:18 133:11 153:19, 24 154:14 162:9 165:2
about (90) 3:5, 12 5:16 7:6,7, 15 13:1,17 19:18 21:11, 15 25:11 31:20 35:1 40:10,13,16 51:4 57:3 59:13 61:3,7 63:11 64:19 66:13 70:19 71:14,20 74:14 76:11 81:3 82:13,24 86:5 90:13 91:19 94:4,14 95:2,3,10 96:18 97:14, 23 99:1 101:4 110:15,23 111:6,8 112:20 115:10 117:5,7 124:6, 21 129:17,23 132:9 136:2, 16 138:22 139:7 140:11, 16 142:6 147:7 148:7 149:10,24 150:19,20 154:23 155:18 156:15 158:22 162:24 166:7 170:3 173:1,4, 23 174:1 176:18 177:12, 14 181:12,24 182:11,12
above (3) 54:4 134:4 158:22
absolute (2) 113:18 161:11
absorbed (2) 80:18 81:18
absorption (17) 36:10,11,11, 18,20,21,21 37:1 72:2,4,8 81:17,18,23 127:16,18 128:2
accepted (1) 28:24
access (3) 48:7, 8 146:2
accessible (2) 65:8 137:10
according (1) 162:3
accumulate (1) 134:8
accuracy (2) 147:10 170:2
accurate (7) 85:8 87:15,23 90:2 100:1 116:11 147:16
accurately (6) 78:24 83:23 89:22 100:16 101:23 147:6
achieve (1) 45:15
acid (85) 11:20 26:19,21,23 27:3,6,15,22 28:6,10 29:13, 17 32:17,24 33:1,3,4 35:5 42:9,16 45:7, 14 46:20 52:16 55:8 58:19 59:16, 16 60:5,9,11, 13,14 64:2 65:13 66:7 68:11,12,14 72:6,13 76:8 77:17,19,21 78:4,8,10,13, 16,17,21 79:4, 5,16,23,24 80:8,9,15,16, 21,22 81:23 83:11 90:10 92:8 102:11 126:19 133:23, 24 134:12 137:8 160:3 171:2 174:6, 13,21 175:11 178:18 179:2, 5,7,10 183:4
acidic (1) 64:16
acquired (1) 19:24
acronym (2) 14:4 38:15
across (2) 67:14 145:16
act (1) 11:11
activity (1) 145:16
actual (7) 10:15 55:21 104:16 121:10 124:15 129:17 144:24
actually (26) 9:3 20:12,12 25:14 50:24 52:12 54:6 62:17 65:11 66:8 70:22 85:10 86:18 90:5,15 92:19 96:7 101:9 103:14 124:15, 22 125:24 129:3 135:17 147:8 152:7
add (4) 36:21, 22 88:22 183:16
added (2) 37:1 138:18
adding (1) 135:15
additional (4) 17:15 18:7 174:20 189:13
address (8) 17:16,23 30:5 42:10 45:17 52:10 59:21 189:10
addressed (2) 41:5 63:3
addressing (2) 52:21 62:6
adjust (1) 65:11
adjustments (1) 65:21
admitted (1) 128:14
advice (1) 174:2
advisor (1) 20:12
affect (6) 4:18 67:18 74:23 179:11,12,16
affected (1) 44:21
affecting (2) 83:2 159:22
affects (1) 179:5
afford (1) 62:18
after (33) 6:15 10:2 11:22 13:9 23:7 29:7,7 35:17, 21 52:1 63:18 81:11,13 82:17 94:22 99:1 103:12 108:19 128:24 131:7 132:16 137:12,18 150:9 157:10 158:24 161:18, 24 162:6 164:23 180:5 182:7 189:4
Again (127) 7:14 18:23 19:3 20:22 23:6 28:8 29:22 31:13,19 33:19 34:16 40:5 43:20 46:17 47:4,10 49:15 50:16 53:9 54:7,10 55:1 60:2 62:24 63:10 66:23 67:16, 17 70:3,11,17, 24 71:10,17 75:11,22 78:9, 18 79:6,24 80:1,6,14 82:20 87:6 89:2,5,19 92:3,16 93:21 94:10,17 95:1, 11,22 96:11, 20 98:19 100:22 105:24 107:13 108:1 109:19 110:2 111:14 113:7 115:2,12 116:6 120:18 121:1,9 122:9, 10 123:7 125:19,22 126:18 129:19 130:9 133:16 134:6,19,21,

22 136:7 137:19 138:2, 24 139:10,21, 23 140:4 141:1,8 143:13 144:5, 21 145:3 146:4 147:2, 10,11 151:5 152:13 154:12 159:17 163:20 165:16 166:15 167:16 168:7, 14 170:4,13 173:5 174:18 176:13 177:4 182:16 183:10 184:11,16 185:17,21 186:8
against (3) 66:22 67:10 163:22
age (1) 80:6
agencies (3) 181:16 182:3 183:8
ago (5) 18:22 50:7 71:15 87:2,2
agree (6) 84:20 92:4 101:10 145:9 157:16 163:15
agreed (4) 7:21 28:24 29:1 97:18
agreement (2) 17:3 70:2
Ah (1) 85:11
ahead (2) 56:11 136:15
air (7) 45:23 62:17 63:24 66:6 77:11 83:3 178:11
airtight (1) 180:16
alert (2) 53:1 54:9
all (57) 3:4 7:7 9:16 10:1 13:10 15:4 16:1 25:19 26:12 29:13 30:19 34:23 41:6 42:23 50:18 56:21 58:19 61:12 64:9,11 69:19 78:19 79:22 81:24 86:17 90:24 93:4 100:7,7,8 102:11 104:1 107:1 111:12 116:19 117:3 119:22 123:7 137:8,10 143:13 147:17 150:11,21 152:4 153:12 157:20 165:2 169:10,19 179:24 181:1, 4 184:21 185:11 186:14 189:12
alleviate (1) 72:9
allow (3) 79:20, 21 145:21
allowed (4) 65:11 80:4 159:20 160:3
almost (6) 10:1 57:9 59:22 106:2 122:16 159:21
alone (3) 19:2 34:1 133:18
along (2) 53:23 167:22
already (11) 16:9 18:8 33:16 35:1,17 82:19 97:3 117:4 139:16 155:21 178:8
Also (16) 23:21 36:6 48:11 53:12 54:17 74:20 77:17 111:22 113:19, 22 154:15 160:1 170:8 172:17 175:12 182:16
although (2) 47:23 52:15
altitude (1) 159:24
always (7) 69:13, 15 76:13 85:6 89:19,20 148:24
ambient (4) 63:24 83:15 101:17 111:17
amount (23) 19:7 64:19 80:3 85:24 88:20 89:17,22 102:14 108:12 111:21 114:15 115:6 138:8, 21 142:2,10, 23 143:1 144:19 145:9 159:21 168:14 177:15
amounts (2) 79:16 144:12
ampersand (1) 17:4
analogy (1) 53:17
analysis (1) 55:21
analytical (4) 8:21 9:13,15, 16
analyzed (1) 150:12
analyzer (1) 77:24
analyzers (5) 77:3,6,9,10, 16
Angeles (6) 8:1,3, 4 20:18 21:1,5
angle (3) 153:15, 17 160:11
angles (1) 158:13
animosity (1) 176:14
announced (1) 33:21
another (15) 28:21 31:15 32:22 35:5,22 36:21 46:20 47:19 58:19 67:15 75:13 96:2 117:14 144:7 157:16
answer (7) 3:9 4:15,19 139:20 140:21 160:20 167:24
answered (1) 139:16
answers (3) 4:21 52:8 152:22
anticipate (1) 50:20
anybody (9) 20:5 51:7 99:20 100:15 131:12 132:8 147:20 148:13 164:5
anymore (1) 13:16
anyone (1) 91:18
anything (19) 4:20 6:17 7:6, 9,12 32:6 45:12 51:20 77:21 91:23 93:17 97:23 98:24 117:7 129:17 132:3 140:20 148:2 150:2
anyway (1) 11:16
anywhere (1) 77:6
apologies (1) 17:24
apparatus (4) 57:22 166:3, 21 179:9
apparently (2) 33:14 95:16
appear (3) 134:8 157:13 163:11
appearance (3) 146:18 153:3 165:4
appeared (1) 182:24
appears (4) 125:5 126:6, 9 189:6
applicable (1) 85:11
application (2) 167:5,10
applied (2) 90:15 94:19
apply (3) 11:10 36:13 53:18
applying (1) 91:6
appreciate (3) 6:13 7:20,22
appreciated (1) 32:16
appreciation (1) 47:1
approach (1) 96:18
appropriate (1) 149:5
approved (3) 90:17,20 94:20
April (3) 48:23 76:8 177:9
area (70) 17:11, 11 25:9 63:23 65:4,7 67:24 68:1,4 69:2,3, 18 70:6 84:12, 24 86:19 102:3 104:5, 21 105:3,7,12,

15,16,23 106:17,19,21, 21,24 109:7, 11,13,16,16 110:10,15,20, 21 111:8,9,18, 19,20 122:22 123:1,2,6 124:4,19 125:2,3,6,11, 13,15,20,24 134:22 139:7 145:15,17 147:8 159:2,4, 5,23 160:20 164:10 180:18
areas (3) 64:13 75:3 133:18
arithmetic (1) 141:2
around (17) 35:20,21 39:8 41:9 43:2 60:12 63:4 68:1 82:11 94:2 129:2 154:7 157:7 158:6, 10,11 160:8
arrive (6) 10:12 107:17 109:24 141:5 144:19 147:15
arrived (3) 97:21 169:22 175:19
ascertain (11) 53:6 75:2 82:21 83:12 84:2 85:15 89:7 90:6 98:9 99:21 146:14
ask (21) 3:8 4:12 5:2 6:7 7:6 29:14 45:4 49:12 96:16 116:15 117:10 118:18 134:15 148:7 157:2 161:3 174:14 176:4 181:6 185:8 186:5
asked (28) 16:12 21:3,10 28:20 44:10 45:2 75:22 95:13 99:5,14,17 100:20 102:6 103:18 104:9 116:19 136:3, 5 139:14 147:21 174:1, 11 175:2,5,24 181:12 182:7, 10
asking (7) 29:24 45:3 53:23 103:24 117:3 151:11 161:16
asks (1) 138:21
assert (1) 143:9
assess (1) 74:17
assessment (3) 90:8 132:7 163:16
assigned (9) 29:18,22 30:9 31:11 34:21 42:24 43:12 47:8 183:21
assignment (2) 35:2 41:7
assignments (2) 41:8 44:7
assist (1) 32:24
assistance (1) 49:22
assistant (1) 32:19
associate (1) 147:13
associated (2) 134:18 170:13
association (1) 132:19
assume (4) 4:15 87:1 125:19 154:19
assumed (1) 105:16
assuming (3) 4:17 182:14, 16
assumption (2) 106:14 112:20
assumptions (7) 85:12 100:5, 9,10 101:12 141:5 147:17
ATC (12) 26:19 28:22 29:3,8, 8 31:3 34:19 47:5,7,19 54:17 137:16
atmosphere (4) 62:21 63:21 78:11 86:11
ATO (2) 32:19 45:3
attach (1) 186:15
attached (6) 57:22 72:21, 22 166:4,21 167:2
attaching (2) 132:13 152:4
attachment (2) 141:1 143:24
attachments (3) 141:11,13,16
attempt (2) 132:16 169:6
attest (1) 67:1
attractive (1) 36:6
August (3) 136:24 137:3 139:15
author (1) 138:4
authorities (2) 173:1,11
authority (4) 51:17,24 98:19 113:10
available (4) 6:11 7:22 145:21 150:11
avoid (3) 3:17 69:18 87:7
aware (5) 5:13 162:23 167:12 170:20 183:23
away (4) 68:3 150:7 178:14 186:13

B

Bachelor's (3) 8:14 9:24 10:22
back (32) 9:9,10 19:15 26:3 34:10 56:19 68:13 85:2 86:16 97:15, 16,22 98:5,15 101:2 106:21 117:17 122:2, 5 148:5 156:17 157:10 161:6,8 162:1, 18 165:20,21 168:17 175:12 180:9 181:11
background (2) 7:23 153:14
backpack (1) 94:23
backtrack (2) 27:9 122:21
bacteria (1) 24:20
bad (7) 3:12 67:16 70:15 113:10 132:1 159:19 168:10
Bailey (1) 72:17
balances (1) 27:21
ballpark (1) 11:16
Barley (1) 32:14
Barnes (1) 176:22
BARNEY (38) 43:11 55:11 56:5,11,18 57:2 71:2,6 73:15,20 74:5 103:16 116:12 117:2 118:11, 17 127:6,11 135:10,14 136:15,22 148:12 151:13 158:9 161:21 162:5,12,21 163:3,7 171:17 181:4, 12 182:7 184:23 185:2 186:14
based (33) 45:11 48:6 51:22 55:6,7,22 73:6 76:4 77:1 83:12 84:10,20,21 101:7 102:12 105:16 106:18 107:11,12,15 116:2,6 119:15 123:19 136:10 146:10 147:4 169:11, 22 174:16 181:20,23 185:18
bases (1) 100:13
basic (3) 22:9 24:18 185:14
basically (2) 51:12 118:19
basis (16) 42:11 46:6,7 47:22 65:4 77:13 83:21 99:22 102:13 108:11 120:5 139:12 140:2 141:1

144:16 147:11
Bates (6) 72:16 73:23 118:18 127:5 136:13 145:13
Baton (1) 156:14
became (5) 20:8 29:8 30:9 32:1 47:21
because (119) 3:23 5:19 6:11 7:7 9:4 13:3 16:20 19:3 23:1 25:19 27:10 29:20 30:17 31:6 34:16,17 35:14,17 36:8 38:18 39:1 40:22 41:12, 19,20,23 42:3 45:23 46:4,17 48:5,7 50:8, 14 52:3,5 53:22 57:6 61:20 62:16 63:22 64:21 65:2 66:5,20 67:17 68:4,9 69:3,16 71:21 74:23 75:18 76:3 77:22 78:13 80:16, 18 81:4 83:20 85:11,16 86:13 87:5,9 88:4 89:4 93:10 95:10 98:6 100:20 103:12 104:13 105:6 108:17, 22 110:2 111:14 112:23 113:11 115:5 117:19 120:3, 22 122:16 124:14 125:11 128:20 130:11, 16 132:22 133:2,10,16 137:23 138:2 139:18 145:6 146:2,7 147:14 151:3 153:12,16 154:6,9,14 158:16 159:21, 22 163:15,21 168:11,19 170:6 172:18 179:2 183:17 186:11
become (2) 41:24 167:12
becomes (7) 6:1 68:22 78:12 79:4 80:9 89:9 93:23
been (56) 5:13, 14,16,17 7:17 14:4 18:22 19:24 21:11 30:24 33:2 37:4 49:9 50:11 57:8,12 61:6 69:1 76:5 80:18 81:15,24 82:13 90:5 94:20 95:8 98:16,17 99:16,17,19 117:14,18 119:9 128:3 132:15,18 137:13,15,17 145:24 147:22 149:5,24 156:22 157:9 161:9 162:23 164:15 167:19, 20 169:8,12 177:20 182:10 185:6
before (32) 3:1 6:15 7:15 8:5, 24 20:13 30:24 33:18 40:14 56:9 58:17 61:4,7 67:22 70:5 72:14 95:3 117:12 121:21 127:17 138:22 149:12 150:12 151:18 156:7, 10 162:24 174:23 180:6, 7 182:11,12
behave (1) 11:11
behaves (1) 101:13
behaving (2) 11:7 157:15
behind (1) 168:5
being (21) 17:12, 19 22:14 43:12 57:14 63:19 66:13 71:7 75:12,13 76:8 77:14,14 94:3 121:16 141:7 147:21 178:23 179:2, 19 181:8
believe (14) 73:7 91:22 96:12, 21 124:8 136:23 161:5, 5,7,8 163:8 165:1 169:21 182:1
believed (1) 159:13
believes (1) 159:16
Bell (7) 5:12 47:17 57:7 73:4 74:9 153:9 165:1
below (1) 189:10
benchmark (1) 168:12
benzine (3) 14:7, 10 16:19
beside (2) 125:7 126:11
best (13) 19:6 41:8 55:4 85:13 86:20 88:8 99:21 101:9 103:8 105:10 140:4, 21 141:6
better (5) 19:8 49:10 64:8 67:2 168:14
between (20) 7:1 8:15 34:23 42:7 44:8 72:3 78:9 90:21 93:11 101:16 111:16 114:14 116:4 124:2 145:5 149:8 151:4,6 164:12 180:14
bi-annual (1) 77:12
big (9) 17:8 27:2 64:22 88:18 89:9 98:21 111:17 122:12 160:2
bigger (6) 122:13 124:5, 6 125:9 145:2 178:11
biggest (2) 24:9 123:5
biobased (3) 24:14 25:7,10
biography (1) 25:21
biomass (1) 25:3
bi-products (1) 25:4
bit (4) 3:5 5:6 9:3 122:21
black (6) 58:1 63:15,19 131:23 133:17 166:8
blank (1) 143:3
blanks (1) 144:11
block (1) 128:10
blower (1) 68:20
blur (1) 156:20
boiler (9) 76:6 155:5,9,18 156:13,16,16, 19,21
boiling (1) 155:15
boot (2) 72:12 135:17
B-O-O-T (1) 72:12
borrowed (1) 167:1
boss (4) 28:14, 24,24 35:8
Both (6) 8:9 38:2,7,10,20 144:3
bottom (4) 23:1 128:17 142:24 179:24
box (5) 63:7 120:10 166:2 180:19,20
boxes (1) 63:4
boy (1) 35:10
brake (2) 53:20, 21
brakes (2) 53:18, 19
branch (1) 13:21
branches (1) 13:20
breaching (1) 18:21
break (5) 4:6,7,8 56:7 71:3
breakdown (1) 10:5
breaks (1) 52:17
Brief (3) 43:9 55:14 118:9
briefly (2) 27:8 74:15

bring (6) 6:12, 14 55:8 77:13, 23 97:5
broad (1) 92:3
brother (1) 156:15
brought (4) 4:7 97:4 101:3 174:8
Brown (1) 26:18
buffer (1) 67:21
build (4) 24:19 28:4 63:4 180:19
building (1) 178:18
builds (1) 179:5
built (2) 28:10 126:8
bunch (1) 137:20
burn (3) 33:2 68:11,14
burning (3) 12:23,23 158:18
Burnside (86) 34:11,20,22 35:4,13 36:4, 9,13,15,17,24 37:22 38:9,15 42:13,24 43:13,15 46:16 47:9,18 48:20 49:15 50:6 57:4 58:5,12 59:5 71:8,14 72:1, 22 77:7 81:9 82:15 90:24 91:3,9 92:23 96:3 99:4,13 117:16 122:1 127:15 128:12, 13 129:1,17 131:5 132:19 135:6,20,24 137:8,12,24 139:17 140:15 146:19 147:23, 24 148:24 151:7 152:8 156:8 158:17 166:3,12 167:11 168:4 173:3,9,14 175:13,16 176:11,19,21 177:2,2 182:1, 21 183:6,21 185:22
Burnside's (1) 137:6
business (5) 13:15 15:16 27:2 45:17 136:9
businesses (1) 25:17
button (3) 51:12 53:11,15
buttons (1) 50:17
bypass (1) 39:8

C

calculate (14) 78:4 87:9,12 89:16,19,20, 22 99:20 105:17 106:18 109:6 123:19 147:15 177:24
calculated (1) 183:18
calculates (1) 123:23
calculating (2) 122:10 125:20
calculation (76) 5:19 27:13, 16,21 55:17 84:14 85:5,6, 8,18,21 86:19, 22,22 87:21 88:10,11 101:15,24 102:5,15 103:18,22 105:2,16 107:7 109:5 111:20,24 112:21 113:1 114:4,20,22, 23 117:8 118:20 119:4, 8,15,20,22 120:6,19 121:3,7,21,22 123:8,12 124:3 126:6,9 138:22,24 139:3,12,15, 22 140:6,21 141:2,6,9 142:9 145:4, 20,21 146:13, 23 147:7,16 165:12 169:11 177:14 185:18
calculations (33) 46:2,7 55:16, 19,20 64:19 83:11 87:7 89:5,6,7 90:8 99:5,11,13,14, 23 100:20,24 111:2 114:11 116:13 119:14 139:21 140:8, 9,16 147:14 174:3 177:11, 21 181:24 185:5
calculator (6) 87:13 107:19 111:1 119:22 124:14,16
California (5) 8:2, 3,12 12:1 13:21
call (20) 12:17 27:18 31:3 32:10,19 33:5 36:10 37:7,18 38:18 72:11 79:4,8 94:15 100:3 127:6 135:17 159:9 162:24 173:8
called (27) 5:15 8:17 12:1 14:18 24:16, 18,22,24 25:17 27:3 28:12 31:6 35:6 50:7 52:7 79:3 95:2,3 131:6 135:20 156:15 161:8,22,24 162:1 182:11, 13
calling (4) 37:13 95:7 173:1,11
calls (4) 130:20 149:1 160:19 167:24
came (8) 22:17 23:11 33:17, 20 40:4 94:17 161:23 175:23
camera (2) 152:7 163:5
cameras (3) 154:13,15 158:12
can (154) 3:9,17, 20,24 4:2,8, 19 5:4 10:20, 21,24 12:10, 12 14:11 16:5, 20 19:6 24:18 25:1,5 27:7 29:14 30:4 32:4 33:23 34:4 41:11,13 42:21 43:6 45:14 46:8 47:3 48:10,11, 12 49:16 50:19 51:4,21 53:14 54:16, 21,24 56:5 62:11,18 63:2, 4 64:4,8,23 67:1 75:19 76:4,12 78:3 79:13 83:9,22 84:2,4,5,6,10, 12 85:6,18 87:9,12,14,15 88:6 89:19,20 98:2,8,20 99:20,22 100:23 101:3, 9,10,22 103:9, 11,12 104:18, 20 105:10,15, 16,22 107:19 108:2,7 109:6, 8,15 110:15 113:22 114:8 115:14 116:9 123:20 124:12 125:20,22 126:4 127:4,6, 13 128:6 133:5 134:13, 24 135:3 136:16 140:21, 24 143:6 144:2 146:9, 11 147:1,1,10, 14,20 148:4 151:23 152:10, 16,21,23 153:17 156:12 157:14,15,20 160:20 161:3 164:7,8,12 165:24 167:24 169:19,21 172:20 180:17 185:13 189:13
candidate (1) 44:4
cannot (15) 42:17 55:2,3 66:10,10 75:5 76:12 78:9 80:19 82:8

96:9 121:2 139:11 152:17 186:11
capable (2) 99:16,19
capacity (1) 112:24
capital (1) 27:24
capture (2) 142:22 180:24
captured (1) 121:14
capturing (1) 178:3
car (4) 53:18,18, 18,21
carbon (1) 37:19
carbons (1) 68:14
card (1) 15:16
care (3) 130:22, 23,24
carpet (1) 24:2
carried (1) 80:17
carrying (1) 22:24
case (12) 17:24 18:2 29:23 31:18 38:23 39:6 46:15 65:6 70:3 95:16 108:24 114:1
cases (1) 62:18
catalyst (1) 74:18
catch (1) 72:13
categories (1) 170:16
category (3) 143:14 144:14 145:6
caught (1) 6:7
cause (3) 41:13 113:12 160:21
caused (1) 19:20
causes (2) 59:17 69:2
causing (4) 49:19 75:3 89:15 184:1
cc (1) 74:8
CD (1) 152:3
cell (2) 114:7 119:21
Center (6) 26:20, 21,24 27:4,6 90:10
centralized (1) 29:13
certain (4) 14:6 60:3 101:12 126:21
cetera (1) 76:1
chain (1) 54:11
challenge (1) 100:15
Chambers (1) 32:13
chances (2) 72:6 138:1
change (8) 19:7 21:21 28:7 50:20 70:21 91:7 110:2 189:5
changed (11) 26:7 27:7,8 37:8 111:10 115:5 128:3 138:13,14,16, 17
changes (4) 45:19 72:9, 10 122:6
characteristic (1) 14:3
characteristics (1) 101:19
cheap (1) 13:5
check (15) 40:22 50:8 52:19 99:11,11 103:12,18,24 116:16 119:21 124:1 154:12 174:12 186:2,7
checked (2) 98:11 125:21
checking (2) 5:19 131:3
chemical (21) 8:10,12 9:9, 20,22 10:3,5, 7,8 13:12 15:8,9 23:16, 21 24:23 25:2, 8 29:10 80:23 126:21 141:23
chemicals (3) 17:18 25:18 26:8
chemist (2) 29:18 31:11
chemists (2) 29:10,11
Chili (1) 151:22
China (1) 151:22
choice (1) 35:9
choices (1) 35:3
choose (4) 36:15 48:6,18 137:21
chose (2) 10:11 35:12
Chu (13) 7:4 56:7,16 73:17 74:2 118:14 127:8 135:11 136:19 148:9 154:22 186:16, 17
CIP (41) 37:2,10, 12,18,22 38:5, 6,9,13,14,20 42:4,12 52:11 54:1 57:8 71:18,21,24 72:4,14 75:8 76:9 82:6,10 90:3 128:16 129:12 132:23 133:2,5 135:16 142:22 145:22 146:7, 8 155:1,16 167:13 181:13 182:22
circle (4) 105:12 106:5,15 126:4
circling (1) 126:2
circuit (1) 175:11
circulates (1) 60:12
circumstances (3) 49:8 98:20 152:20
city (4) 20:16,16 28:12 69:2
claimed (1) 70:15
clarification (1) 4:17
clarify (2) 37:12 181:7
classification (1) 172:13
classifications (1) 170:14
clear (6) 68:3,7, 9 77:20 126:2 132:20
clearing (1) 145:17
clearly (1) 100:11
Clemons (3) 54:14 58:15 132:12
client (2) 16:13 19:12
close (5) 30:13 46:9 57:7 154:11 181:8
closed (1) 30:18
closer (3) 39:11 72:5 124:22
close-ups (1) 133:3
closure (1) 33:21
cloud (3) 68:4 70:10 154:1
clouds (2) 67:13 70:7
cloudy (2) 66:21, 22
CO2 (2) 11:9 109:22
coal (4) 12:8,9, 19 38:14
coasting (1) 68:21
coefficients (1) 103:21
coffin (1) 96:2
cold (15) 37:16 38:16,18,21 41:11 42:3,7, 12 45:7 54:2, 5 61:19 62:1, 5,12
collaborate (1) 96:9
collaborated (1) 96:11
collaborating (1) 95:23
colleagues (1) 10:13
collect (2) 72:13 78:2
collected (1) 76:9
collection (1) 116:21
college (2) 32:21 172:4
colon (1) 157:12
color (2) 132:22 134:9
Colorado (5) 8:6, 6,13 9:5 20:9
combination (1) 69:24
combustible (1) 12:10
come (19) 56:18 58:7 70:13 80:12 88:3,8 100:24 101:9, 14 104:22,23 134:7 145:23 146:11,12 148:23 175:15, 16 185:24
comes (8) 44:2 77:21 80:10, 19 81:3,14

85:20 137:24
comfortable (4) 18:19 30:16 96:14,15
coming (22) 7:19 17:7 72:7 78:3 79:4,16 80:2,3,12,23 81:5,18 89:17, 22 135:16 151:17 152:24 153:16 154:21 159:1,2,19
command (1) 54:12
comment (1) 76:1
commenting (1) 74:11
comments (2) 126:15,16
common (1) 126:18
communicate (2) 118:4 148:22
communicated (1) 151:1
communication (2) 149:4,7
community (1) 160:10
companies (4) 12:20 20:3,4 44:7
company (15) 8:17,22 12:1, 16 13:11,13, 22 14:20 15:15 19:5,23 24:16 45:24 54:23 176:13
compare (5) 12:21 38:8 92:18 118:24 168:12
compartment (1) 81:10
compartments (1) 81:9
complain (1) 70:9
complaints (1) 160:10
complete (8) 16:14 40:24 48:14 74:6 143:7,10,14,17
completely (3) 67:9 69:4 106:16
complex (1) 78:22
complexity (1) 33:6
compliance (4) 16:8,11 18:8 39:15
complication (2) 88:1,22
complies (3) 73:9 126:5 128:9
compliment (1) 9:2
comply (4) 14:1, 5,11 17:20
component (5) 14:7 102:7 153:2 178:19, 20
components (2) 23:24 83:24
composition (8) 83:22 101:19 103:20 104:3, 12 107:15 108:17 121:17
compositions (1) 104:15
compounds (2) 11:13 171:1
compressor (1) 41:21
comprise (1) 129:12
comprised (1) 29:9
compromised (1) 180:5
computer (9) 10:14 27:19 48:9 49:16 103:13 104:18 115:17 140:17 186:12
concentration (11) 18:11 77:22 81:12,13 83:14 110:3,5 114:18 115:4 172:3 180:4
concentrations (2) 66:12 82:3
concept (1) 58:19
concerned (2) 76:11 82:22
concerns (3) 42:15 148:17 149:15
concluded (1) 186:19
conclusion (1) 40:4
conclusions (1) 56:14
condense (2) 25:23 72:8
condition (4) 28:22 83:13 135:9 155:14
conditions (11) 55:22 59:1 64:16 83:15, 16 99:21 101:22 111:12 112:6 115:9 124:2
conference (1) 32:3
confident (1) 132:9
confidential (1) 18:15
configuration (4) 35:15 36:4,5 127:16
configured (1) 37:8
confirm (5) 16:24 40:19 77:15 116:6 117:4
connect (1) 60:18
connected (5) 37:7 58:24 59:1 128:23 166:11
connection (1) 177:1
connections (2) 180:14,16
connects (3) 60:3, 16 127:23
Conoco (16) 19:23 20:2,6, 14,15 21:7,8, 9,13,18 22:2, 7,13,21 172:16,18
consensus (1) 169:23
consequences (2) 50:22,23
conservative (3) 84:13 108:8,9
consideration (2) 101:18 121:11
considered (1) 172:14
consistency (1) 123:24
consistent (3) 121:18 160:15 164:1
consists (1) 129:12
constants (1) 103:21
constraints (1) 45:16
construction (3) 37:20 38:4 54:19
consultants (2) 54:18,18
Consulting (4) 8:17 11:24 13:11 14:20
consumption (1) 48:17
contact (1) 29:19
contain (4) 63:5 86:9 183:17 184:18
contained (9) 60:5 64:23 65:1 69:22 86:11 180:12, 13,20 185:19
container (2) 101:16 144:12
containing (1) 178:1
containment (2) 63:7 86:9
contains (1) 63:24
contaminants (1) 14:24
continue (4) 92:9, 21 98:10 159:20
continued (2) 61:21 184:9
continuous (2) 57:13 88:7
continuously (1) 78:21
contractor (3) 77:15 80:11 180:23
contrast (2) 66:16 133:16
contribute (4) 28:18 32:6 130:16 131:1
control (20) 42:20,20 48:12 57:19 58:22 59:8 60:4,15,21 64:7 65:9 84:7 94:23 117:19,20 165:24 166:11 167:5 179:17 182:18

controlled (2) 53:14 183:1
convenient (1) 53:22
conventional (1) 37:20
conversation (5) 3:14 5:6 98:3 155:18 168:17
conversations (3) 5:11 6:16 91:17
conversion (5) 74:24 75:3, 12,24 106:2
convert (2) 13:5 105:9
converted (6) 72:2 81:12, 16,21 82:1 108:18
converter (32) 37:4,6 39:8, 24 52:11 54:2 57:8 74:18 75:9 81:7,8 82:6 90:4 102:19 127:14, 22 128:3,8,17 152:9,12 154:12 155:2, 4,5,15 156:21 159:3,3 167:14 181:14 182:22
converting (3) 12:9 74:19 106:4
convince (1) 20:18
convinced (1) 40:8
convincing (1) 40:21
cool (1) 72:6
coordinator (1) 173:16
copies (5) 56:8 140:23,24 189:11,13
co-product (1) 155:7
copy (1) 74:6
corn (1) 24:21
corporate (2) 175:2,5
correct (11) 7:5 88:14 90:11 121:11 122:3 124:8 125:21 126:10 128:23 166:7 185:17
correction (1) 189:5
correctly (3) 14:17 127:22 170:8
correlate (1) 116:9
correlates (1) 171:19
correlation (5) 39:22 85:11, 13 101:9 115:12
corroded (1) 133:18
corrosion (10) 38:22 39:5 42:1,17,18,20, 21 52:24 64:15 134:20
corrosive (1) 41:24
corrugated (3) 63:16 64:3 166:19
cost (3) 12:18 28:3 33:24
cost-effective (3) 13:5 28:3 34:2
costs (3) 12:21, 22 20:24
could (26) 11:2 17:20 32:6 44:19 61:18 80:22 82:6 96:22 113:12 115:18 116:16 126:1 130:16 133:9,19 140:7 146:2 168:20,22 170:10 174:21 177:9 178:21 179:1 183:18 184:14
couldn't (4) 83:18 117:20 133:8 168:22
counsel (1) 189:12
couple (10) 6:21 7:17 8:5 13:21 29:10, 11 36:23 40:8 50:7 155:8
course (4) 5:23 60:12 65:1 168:13
court (3) 3:9,17, 23
cover (1) 90:9
covers (1) 74:14
crack (5) 85:4 86:3 111:7,19 112:5
cracks (14) 87:18 89:14, 18,23 90:3 100:1,17 129:18 131:13 169:17 184:1, 5 185:4,12
crank (4) 165:16, 20,21,23
create (2) 24:23 68:11
created (1) 58:15
criteria (2) 53:12 181:19
critical (1) 83:24
Cromwell (4) 33:8 97:18 148:5,24
cross (3) 84:24 104:21 105:14
crunch (1) 124:12
crunched (1) 121:5
cubic (1) 78:5
current (6) 90:18, 21 128:4,7 130:19 175:9
curtailed (1) 33:15
customer (3) 15:17 16:10 18:24
cut (12) 23:7 97:15,16,22 98:5,14 120:20 124:9 161:6,8 162:1, 6
cuts (1) 22:22

D

damage (2) 113:12 131:17
Dan (5) 72:17 74:8 75:17 100:4 146:21
danger (1) 52:20
Daniel (4) 12:2,3, 4,24
dark (4) 66:16, 20 67:9 163:22
darkness (2) 67:7, 8
data (15) 10:12 24:18,18 73:7 75:16,18,18 104:20 115:14 116:13,17,21 147:1 162:16 174:16
date (17) 39:11 56:1 75:9 94:1 95:5 103:6,15 136:23 137:2, 3 143:10,11, 15,19,21 144:2 189:9
dated (5) 72:20 73:21 74:7 142:20 157:1
dates (8) 25:19 33:20 34:15 60:1 94:1 118:2 144:4 156:19
day (11) 49:2 66:21 79:12 94:7 95:23 108:13,14 115:18 157:10 168:20 182:9
days (6) 48:4,22 50:7,9,10 189:17
daytime (4) 66:5, 21 79:13 163:22
day-to-day (6) 32:23 47:13, 14 48:2,24 173:20
DC&F (1) 26:7
DCS (10) 48:8 49:15 75:20 98:2 108:20 115:14 116:17, 21 147:1 174:16
DCSE (6) 25:18 26:6,7 27:1,2, 11
DE (1) 189:21
deal (2) 32:10 172:18
dealing (2) 17:21 176:5
debatable (1) 147:10
Decatur (1) 24:15
December (8)

72:22 73:7, 22 74:8 82:12 117:21 127:21 164:15
decide (4) 16:1 44:18 54:15 101:1
decision (3) 22:19 54:4 97:22
decisions (1) 51:4
declined (1) 20:23
decompose (1) 68:10
decomposes (1) 68:13
dedicated (1) 91:1
degree (5) 9:9, 21,24 11:22 49:13
degrees (3) 8:9 20:3 178:22
Delaware (3) 28:11,12 69:2
denominator (1) 113:20
department (1) 21:18
depend (1) 21:5
Depending (14) 77:10,11 80:5,5 81:6, 23 82:1 98:19 109:10 154:8 160:10 178:20, 24 179:18
depends (4) 52:22 66:24 169:4,10
depict (2) 42:21 158:15
depos@wilfetcom (1) 189:22
deposition (20) 3:1 5:5,10,15 6:18 56:9,16 73:17 74:2 103:12 118:14 127:8 135:11 136:19 148:9 164:17 186:17, 19 189:4,16
depositions (2) 5:13 7:15
DEQ (1) 167:15
describe (2) 31:1, 2
described (2) 94:9 95:12
describing (3) 94:11 108:10 152:20
design (15) 28:2 37:1,17,21,23 38:3 46:3 60:7,9 128:11 166:5,20 167:1,3,7
designed (6) 46:10 64:3 74:17 128:21 166:18 177:21
designing (1) 9:13
designs (1) 8:21
details (1) 130:9
detect (1) 66:11
detected (1) 70:4
determination (4) 145:4 169:18 183:13,15
determine (26) 16:7 31:12 53:7 74:21 75:2,5 84:4,6 88:16 101:11 103:9 104:20 108:12 114:4 121:2,24 126:20 130:14 144:14 159:10 162:15 169:19 179:19 181:20 183:9,18
determined (3) 84:18 126:23 183:11
develop (4) 10:20 24:17 184:8,14
development (1) 24:16
diagram (1) 128:10
diagrams (2) 16:24 17:4
diameter (14) 105:3,8,11, 13,17,19 106:21 122:12 125:7,10,12, 13,19,23
did (101) 6:9 7:10,24 8:15, 19 9:19 11:1, 23 12:5,24 13:9,17 17:13, 15 18:12 21:17,21 22:10,22 23:5, 11,20 24:3,11 25:9,13 26:1 27:17 28:6 30:13 34:12 36:16 37:9 38:12 40:3,13 42:14 43:13 47:12 48:7,21 58:7,12 59:12 60:17 61:20 62:2 64:18 65:24 69:17 70:9,21,22 71:8 74:13 76:2 84:8 86:9,18 90:13 91:17 92:4,23 93:2,10 94:14, 14 96:21,24 98:10,24 112:12 113:7, 8 121:12 129:17 135:23 136:5 138:24 139:3,17 140:15 143:22 148:13,23 149:13 156:5, 8 167:12 172:15 173:14, 18,21 175:14, 19 176:2,3,4, 5 181:15 184:10
didn't (32) 5:23 6:17 7:16,20 10:14 18:3,7 29:23 47:8,14 49:12,13,21 69:9 90:9 92:21 96:13, 15,17 110:2, 12 111:1,3 117:7,10 130:5 138:5 148:24 168:19 173:13 176:9, 14
die-hard (1) 22:12
difference (6) 42:6 101:15 122:12 124:1, 2 164:12
different (22) 26:9 27:10 31:9 36:5 37:17 38:4,6 47:11 49:8 55:22 104:14, 14 109:7 122:11 123:4, 5,15 127:1 158:13 160:11 169:21 176:13
differential (1) 111:16
differentiate (2) 80:20 153:24
differently (1) 157:15
difficult (1) 88:16
digits (1) 87:13
dime (1) 84:24
dimensions (2) 128:4 129:14
dinner (4) 50:1 156:14 168:17 170:1
direct (2) 39:24 84:15
directed (1) 104:24
direction (6) 39:16,17 44:13 69:12, 15 160:11
directive (1) 61:17
directly (8) 54:11 99:8 108:21 109:15 113:1, 22 115:14 123:1
disagree (2) 181:1,3
disappointed (1) 91:13
discern (2) 142:9 152:24
discharge (3) 14:12 18:11 19:9
discharged (1) 17:12
discharging (2) 17:2 102:4
discoloration (3) 133:18 134:24 135:2
discontinued (1) 62:3
discouraging (2) 172:24 173:10
discovered (1) 150:10
discuss (1) 91:23
discussed (1) 101:24
discusses (1) 142:22
discussion (7)

5:16 18:20 36:14 61:12 97:13 131:2 149:24
discussions (7) 50:5 91:20, 21 94:3 147:3 154:23 169:22
dispute (9) 153:6, 8,10,12 159:14,16 169:3 170:2,4
disrespect (1) 93:21
dissipate (2) 154:6 159:1
dissipates (3) 157:18 163:16 164:9
dissipating (1) 159:24
distance (2) 31:20 72:3
distilled (1) 25:4
distract (1) 141:7
distribute (1) 189:11
distribution (6) 82:3 137:9, 18,19 143:18, 22
distributions (1) 39:21
distrust (1) 151:3
disturbing (3) 160:5 161:3 164:8
divide (3) 107:20 108:1 110:20
divided (1) 105:13
division (3) 22:5 23:23,24
divisions (1) 26:9
document (24) 44:3 56:13, 14 72:15 73:16 100:24 101:4 118:12 120:20 121:2 127:13 128:7 141:6,12 144:8 148:3 149:6,11 150:10,23,24, 24 151:8 168:12
documentation (2) 90:2 185:3
documented (3) 150:12 183:11 184:12
documenting (1) 150:15
documents (8) 5:7 6:19 7:9 56:8 101:2 127:4 136:12 144:3
dodge (2) 69:9, 17
dodging (1) 70:7
dollar (1) 85:1
Don (1) 155:24
done (30) 25:22 47:16 48:4 55:18 75:19 78:24 79:13 82:16 83:18 85:19 96:15 99:21 101:8 102:20,24 108:6 112:22 121:3 122:8 126:6 129:23 145:18 162:23 174:24 175:22 181:8 182:10, 12,19 183:24
door (1) 157:6
double (9) 36:24 109:10,14,16, 17 110:5,6 114:2 125:23
double-check (2) 175:3,6
double-checked (1) 175:14
doubled (3) 109:24 110:4 125:13
doubling (2) 109:13 114:2
down (38) 3:10 10:11 51:5,9, 13,21 52:18 53:8,10,12,13 57:14 62:8 68:17,20,21 70:23 72:6 81:13 98:9 113:11,13,13 142:24 145:15 148:21 154:23 155:4,11,15 156:2,10,19 157:10 161:14 162:6 168:4 178:4
downstream (1) 116:3
dozen (1) 13:22
drafted (1) 143:8
drains (1) 16:21
draw (4) 54:16, 21 55:6 129:6
drawing (3) 127:14,15 129:7
drawings (1) 129:14
drawn (1) 68:19
draws (1) 60:11
Drew (4) 93:2,3 128:14,24
drip (2) 133:23 134:12
dripping (1) 134:1
drive (1) 12:13
driven (1) 136:8
driving (1) 179:15
drop (1) 39:3
dropping (1) 94:22
drops (2) 41:20 76:1
dry (4) 166:11, 15 178:9 180:8
drying (4) 57:20 58:24 60:6,16
DSF (1) 132:9
DSF0000083 (1) 118:18
DSF15 (1) 136:13
DSF618 (1) 72:16
dual (7) 36:10, 11,18,21 72:2 81:23 127:18
duct (26) 52:16, 23 61:24 62:15 63:8 64:22 65:19 72:14 82:2 83:13 86:1 100:16 101:17 102:18 104:4, 17 111:16 113:3 114:19 116:2 134:17, 24 145:23 153:1,16 167:15
ducts (7) 60:15 68:6 85:16 101:11 104:14 127:23 134:13
due (1) 52:24
DuPont (54) 7:21 11:15 21:9,11, 13,23,24 22:8, 10,11,16 23:19 24:11 25:15,16,18 26:7 29:13 30:1 41:6 43:24 44:7 46:20 51:14 71:8 72:22 79:23 82:15 87:16 89:13 91:2 93:17 102:11 130:17 131:5 135:3, 20 149:18 150:3,21 152:8 161:24 162:1 167:12 168:18 172:7, 12,21,23 176:11 181:17, 18 185:6,14
duPont's (1) 24:8
DuPont-wide (2) 150:17,19
duration (28) 84:3,17,22 86:6,7 87:22 88:20 100:2 102:9 104:8, 10,21 107:3, 12 108:11 110:7 112:13 123:13,20 124:10,16 139:7 142:18 145:10 147:5, 12 161:4,16
during (27) 8:19 13:4 31:23 33:8,11 34:23 48:20 54:2 56:7 63:13 64:10,17,20 67:12 69:6 70:8 76:5,7 84:21 92:22 97:6 131:7 132:15 157:7, 8 167:11 168:17
dust (1) 164:7
duties (3) 26:12, 17 27:12
duty (1) 27:14

E

each (14) 3:10,

11,16 6:23 16:22 29:17 30:2 65:18 77:11 80:4 126:24 127:2 128:23 142:7
earlier (16) 46:24 57:3 63:11 81:3 82:14 83:10 101:5,24 104:14 117:24 135:18 147:8 148:7 162:15 166:1 177:12
early (3) 23:2 41:5 117:15
easier (6) 30:2,5 32:1 66:14,15, 17
easiest (1) 115:13
easily (2) 98:3 157:18
easy (3) 87:4,5 154:12
edit (1) 144:4
educated (2) 105:24 146:14
education (2) 172:4,11
educational (1) 7:23
effect (3) 63:7 111:17 114:10
effective (2) 59:8 179:18
effectiveness (4) 178:12 179:12,16 180:4
efficiency (2) 177:24 178:7
efficient (1) 74:19
effort (2) 19:11 104:10
efforts (1) 152:1
eight (5) 110:16, 17 111:4,18 112:5
either (20) 16:10 33:14 35:3 53:6 80:24 94:16 100:12 101:22 102:1 104:9 108:7 111:3 119:19 131:7 133:22 136:8 140:23 153:10 163:23 172:2
electrical (3) 10:3 68:16 69:1
electricity (3) 12:11,14,21
electronic (1) 140:24
Elizabeth (10) 33:8,17 54:13 97:17 98:12 146:21 148:5,24 151:6 155:11
else (10) 7:9 44:17 91:18 95:13 112:2,4 122:9 131:5 138:15 157:19
e-mail (22) 22:9 72:17 73:14, 21 74:7,7 76:15 132:10, 24 139:23 148:4,8,13,20 149:4,6,21 150:4,14,23, 23,24
e-mails (2) 75:10 137:20
embraced (3) 46:12 47:9 49:23
embracing (1) 49:22
emergency (5) 51:11 52:14, 17 53:11,17
emission (4) 48:17 79:20, 22,24
emissions (16) 39:9,9,12 40:1,14 45:24 46:4,8 67:18 70:3 75:4,13 76:24 77:1 85:16 184:2
emit (1) 80:4
emphasis (2) 9:19,22
empirical (1) 85:13
employee (2) 22:13 70:9
employees (3) 13:17 69:9 173:1
encounter (2) 37:10 38:12
encountered (1) 39:14
end (10) 25:5, 11 26:13 33:10,14,17 43:3 63:23 135:16 155:19
ended (1) 36:17
energetic (1) 154:9
energy (2) 27:20 179:3
engineer (32) 12:7 13:8 15:9,10,13 23:15,16,17, 21 29:18 31:11,15 32:18,21,24 34:19,21 42:24 45:2,3 47:6,7,19 49:9,10 82:22 85:21 87:8 89:10 91:2 100:6 129:4
engineered (3) 166:5,24 167:3
engineering (18) 8:10,12 9:9, 21,23,24 10:5, 7,8,16 11:24 12:18 21:24 23:22 24:2,13 25:15 49:13
engineers (6) 10:2 15:8 29:10 31:3 49:11 93:11
enjoyable (1) 51:1
enjoyed (1) 32:15
enjoying (1) 91:8
enough (28) 11:6, 10 18:19 21:6 22:23,24 23:7 29:22 35:18 40:10,20 41:2 59:20 64:22 78:22 89:8 92:8,12 96:14, 15,18 113:10 131:1 145:24 153:7 179:8 183:17 185:3
entailed (2) 24:19 59:15
Enterprise (1) 25:18
entry (2) 95:19 97:14
environment (7) 43:17 47:2 68:12 76:18, 22 92:6 175:10
environmental (21) 13:11 16:2 79:19 99:10 144:18,24 145:7 170:15, 19 171:5,23 172:6,9,11,14, 20 173:2,16, 22 175:13 176:23
environmentally (1) 16:5
envision (1) 43:13
EPA (2) 167:15 169:13
equals (2) 107:8 125:3
equation (7) 83:20 84:14 102:12 106:14 107:4 113:19, 20
equipment (39) 18:7 27:23 36:17,19 37:11 42:8,22 45:17 46:3 53:16 54:1,9, 20 57:23 60:3 67:22 69:8 81:4 82:5 83:13 85:15 86:1 89:14 101:11 113:4 127:20 129:18 131:14,17,17, 20 133:20 134:24 151:18 154:24 166:4, 19 185:5,13
equivalent (13) 84:24 105:3, 8,10,20 106:19 122:12, 22 124:4,17 125:7,9,18
E-R (1) 35:11
errata (6) 189:6, 9,12,13,17,19
errors (1) 46:1
escape (1) 177:5
escaped (1) 147:20
escapes (3) 78:11 178:4 185:20

escaping (6)
64:20 69:5 75:8 83:6 85:5 87:17
especially (5)
10:16 20:4 65:13 66:12 154:13
Essentially (10)
12:8 14:5 24:22 30:19 32:20 35:23 36:20 37:14 42:19 179:22
establish (3)
93:11 97:7 186:8
established (1)
122:24
establishes (1)
185:18
estimate (37)
17:11 28:1 83:16 84:1,10, 10 86:5,20 87:23 88:3,4 101:23 102:13 103:8 105:6, 11,21 108:8 109:8 114:13, 21 116:1,3 146:1,12,13, 17,17 147:8 169:12 174:6, 12,16,24 175:3,14,20
estimated (6)
83:23 84:23 104:16 108:22 116:10 174:15
estimates (3)
12:18 102:1 116:7
estimating (2)
89:3 146:6
et (1) 76:1
ETA (1) 55:11
ethical (1) 51:19
evaluation (1)
16:14
evaluations (1)
12:8
evaporated (1)
25:4
even (57) 3:4,23 6:1 7:18 13:6 16:9 26:8 29:22 32:2 37:13 42:12 44:9 45:4,20 46:18 47:4 48:13 51:19 52:1 53:11 54:11,22 55:2, 3,20 57:17 58:20 64:14, 24 85:9 86:2, 18 92:9 113:3 115:4 123:3 125:12 129:4 130:7,16,18, 24 133:8,11 135:1 137:16 143:12 145:5 146:5,5 159:18 161:1 163:4 167:6 169:5 172:8 179:4
evening (1) 162:8
event (5) 94:8 99:1 102:16, 17 145:1
events (1) 170:15
eventually (11)
20:8 32:23 41:24 42:23 61:19 64:4 78:12 134:1, 13 161:23,24
ever (12) 3:1 98:13,16 99:4, 5 121:20 135:23 137:5 167:12 172:24 182:21 183:24
every (7) 31:16 53:8,21 80:11 100:8 115:18 183:20
everybody (2)
76:24 185:10
everything (5)
48:4 81:22 109:7 112:2,4
evidence (2) 76:6 161:5
evident (3) 80:15 93:23 108:21
evolved (1) 78:5
exact (6) 39:11 49:3 60:1 94:7 118:2 152:14
exactly (12) 11:4 33:19 59:14 62:9 82:18 87:10 95:14 106:6 108:15 116:8 132:23 170:24
EXAMINATION (19)
43:10 57:1 71:5 73:19 74:4 117:1 118:10,16 127:10 135:13 136:21 148:11 158:8 161:20 162:20 163:6 171:16 181:9 185:1
example (17)
14:6,17 15:5 16:12,18 44:10 45:22 52:15 68:8,15 81:6 86:12 106:20,22 119:4 127:23 145:4
exceeded (1)
182:1
exceeds (1) 79:6
Excel (2) 83:10 121:12
excellent (1)
98:11
except (1) 48:22
exchange (1)
145:24
exchanged (1)
75:11
exchanger (22)
37:14,19 38:1,3,17,18, 21 39:3 41:11 42:4,13 58:21 60:19,20 61:23 63:8 76:5 82:2,24 133:4,10 159:4
exchangers (4)
36:23 38:11 74:22 129:15
exchanges (1)
76:15
excretion (1)
174:14
excuse (3) 108:4 122:21 155:5
execute (1) 60:21
executed (1)
189:11
exercise (2)
109:2 141:3
exhaust (1) 12:12
Exhibit (90)
56:12,13,15, 16 73:16,17 74:1,2 101:4 103:2,3 111:9, 20,22 112:6, 18 113:16 118:13,14,21, 24 119:1,7,11, 13,16,24 120:1,6,7,9, 14,16,22 121:7 122:4, 19,19,20,23, 23 123:10,13, 13,19,21 124:2,3,4,5,8, 16,19,20 125:2,6,8,10 126:3,11 127:7,8 135:11 136:17, 18,19,23 137:2,3 138:7, 11,20,23 140:11,13,13, 16 141:12,17, 20,22 142:21 145:11 148:4, 9 150:22 152:4 174:7 177:12 186:17
exhibits (2)
140:12 174:5
exit (5) 121:19 127:24 128:1 152:13,15
exiting (4)
102:18 104:4 152:21 178:21
expanding (1)
68:23
expands (2)
88:24 89:1
expect (15)
39:23 47:9 143:15 145:18, 20 160:16 163:20 165:6, 8,11,15,18,22, 23 167:7
expected (4)
43:20 65:11 71:23 147:4
expensive (1)
42:19
experience (17)
15:14 36:13 44:6 47:7 49:5 55:7 66:15 71:22 148:16 149:4, 19 150:3,20

160:2 170:10 172:6,23
experienced (1) 7:16
experimental (1) 10:11
experimenting (1) 32:18
experiments (1) 10:12
expert (1) 132:5
expertise (5) 78:23 126:20 134:22 136:10 160:19
experts (1) 54:23
explain (5) 44:4 74:13 86:24 145:11 164:6
explanation (3) 155:12 163:14 176:2
exploration (2) 9:17 172:19
extended (2) 167:9,9
extent (4) 6:19 75:5 160:19 167:24
external (15) 39:5 41:14 58:21 75:6 76:11,20 82:21,23 89:15 99:7 129:20 131:19, 21 133:1 145:23
externally (2) 100:13 181:21
extractions (1) 11:12
extreme (1) 42:4
eyes (3) 152:23 160:14,22

F

facility (7) 16:16, 20 17:14,15 19:6,23 160:13
fact (12) 20:13 59:3 67:1 72:9 88:12 95:24 96:16 114:4 141:8 151:1 159:20 179:2
factor (2) 89:11 91:7
factors (1) 113:20
facts (1) 100:5
failure (1) 68:16
failures (1) 69:2
fair (2) 93:15,16
fairly (4) 33:3 101:23 178:23 183:1
familiar (9) 30:3 58:4 73:2 111:1 135:19, 22 170:18 179:6,8
family (5) 47:24, 24 50:1,6,6
far (9) 6:23 21:10 51:24 61:3 103:19 144:7 150:3 180:16 185:13
feasible (1) 78:20
February (4) 94:2, 18 95:20 148:6
federal (1) 127:1
feed (2) 33:13 158:19
feeding (1) 24:20
feedstock (1) 39:20
feel (8) 18:18, 20 51:20 52:18 96:13, 15,17 157:3
feeling (2) 93:22 149:10
feet (5) 70:18 78:5 106:22 110:22,22
fell (1) 145:5
felt (8) 19:10 30:15 40:16 41:1 53:24 71:10 97:2 99:1
fence (3) 67:20 70:1,4
fermentation (1) 25:2
Fetzer (1) 189:20
few (7) 6:11 14:4 20:2 69:1 131:4 181:7,7
fiber (1) 24:1
fibers (1) 25:8
field (7) 75:19 116:7 126:13, 15,16 154:16 186:9
fields (1) 166:11
figure (8) 28:1 33:22 40:15 62:2 69:12 78:16 125:6 155:12
figuring (1) 17:17
file (2) 103:14 141:18
filed (1) 189:16
files (1) 34:15
filled (2) 144:11 149:18
filling (1) 179:10
fills (1) 179:7
filtered (1) 25:3
final (5) 143:6, 12,16,20 144:10
finalizing (1) 150:13
find (9) 17:13 32:3 130:5,6 134:2,5 164:24 165:2 170:8
finds (1) 14:7
fine (8) 6:5 18:16 44:15 50:4 103:9,16 168:20 170:6
fines (5) 167:21 168:8 170:3, 11,13
finish (2) 4:23 71:11
firm (2) 13:18,19
first (43) 7:14,15 10:1 16:18 20:23 26:13 28:10 30:11 32:13 34:13 41:22 43:3 67:19 69:14 71:9,13 73:10, 16 81:7,9,10 94:14,22 95:11 109:12 116:18,19 117:8 120:13 127:12 138:9 150:1 154:19 164:14,16 174:24 175:12 177:6,7 182:8 183:22,22 184:17
firsthand (1) 98:22
fit (1) 22:12
five (5) 35:23, 24 48:4 79:9 107:16
fix (6) 70:19 118:6 154:24 183:24 184:10, 15
fixing (2) 184:5,6
flakes (1) 134:21
flat (1) 133:10
Floor (1) 26:8
flow (4) 41:19 107:12 110:5 128:10
fluids (2) 11:5,17
Fluor (3) 12:1,3, 24
F-L-U-O-R (1) 12:4
focus (3) 10:6, 17 129:20
focused (1) 152:8
folks (11) 22:21 54:14 55:2 65:15,22 66:13 67:19 72:18 92:23 162:19 175:16
followed (1) 121:6
following (1) 189:7
follow-up (1) 184:23
force (1) 100:23
forecast (1) 42:21
forget (4) 21:10 56:1 95:24 175:9
forgot (1) 6:12
form (14) 5:20, 20 39:1 64:1 88:10 129:13 138:13,14,20 139:23 140:10, 10 142:20,21
formal (7) 149:17,21,22 150:4,6,14,24
formation (1) 134:13
formed (1) 179:2
forms (2) 135:19 140:6
formula (28) 86:4 119:4,9,14,15, 21 120:2,3,5, 7,9,14,16,21 121:6,6,10,13 122:3,5 123:8, 23 124:9 126:3,7,8

139:9,12
formulas (1) 177:14
forward (1) 148:13
fouling (3) 39:1 41:12,18
found (11) 40:10 43:24 47:2 61:21 84:5 85:14 86:8,24 165:12,16 185:11
four (10) 13:20 21:9,12 22:2, 5 35:23,24 63:14 81:9 105:13
fourth (2) 81:20 129:9
four-week (1) 70:9
frame (1) 6:3
free (1) 157:3
freedom (1) 44:17
freeze (1) 59:17
fresh (1) 32:21
friend (3) 5:12 23:14 130:21
friendly (1) 93:6
friends (5) 9:7 19:21 20:6 47:21,22
fuel (3) 12:20, 23 68:11
fugitive (1) 85:16
full (2) 165:7,8
fully (3) 49:7,17 80:18
fume (1) 163:24
fumes (6) 66:17 134:7 146:10, 10 147:5 158:6
fuming (1) 165:4
fun (1) 13:8
function (4) 37:16 38:2 114:17,18
furnace (5) 68:10, 17,22 69:4 91:4

G

gallons (1) 18:4
gas (128) 5:16, 21 9:14,17,18 11:9 12:10,23 13:4 21:20 36:23,23 37:14,14,15, 16 38:2,2 39:8 41:19 42:5,6,7 52:21 55:18 58:20 60:19, 19 62:12,23 64:19,22 66:11 67:13 68:4,11 69:9 70:7,10 72:6, 7 74:21,22,22, 23 75:6,8 76:3 77:2 78:2,3,5,7,12 81:4,6,10,18 82:2,2,7,24 83:5,16,24 84:23 85:5,8, 24 87:16 89:17,22 94:5 99:5,7 101:11, 13,14,19 104:4 107:11, 15 108:17 109:20 111:21 112:9 113:5 114:15 118:23 120:12 121:5, 8 138:1 141:24 142:7, 22 145:14,22 151:17 153:2 157:16 159:4, 13 160:24 164:1,3 167:5, 7,8,13 173:1 177:15,19 178:3,4,14,23 179:1,17,20, 22,23 180:2,3, 20,24 181:1 185:15
gaseous (1) 12:20
gases (11) 11:6 53:16 60:14 66:10 68:19, 23 69:5,23 83:14 166:18 178:21
gasification (1) 12:8
gathered (1) 150:12
gauge (3) 146:9 163:12 183:3
gave (3) 35:8 109:6 122:2
Gene (4) 54:14 58:15 132:12 155:11
general (11) 9:20 10:7 30:2 31:7 92:7,11, 20 106:10,13 121:16 159:23
generally (8) 21:17 27:16 48:12 79:5 134:6 152:15 185:24 186:3
generate (7) 12:11,13,14, 21 24:21 112:5 155:7
generated (2) 17:19 107:2
generates (2) 64:2 66:6
genetically (1) 24:20
Geochemistry (1) 8:18
geologists (1) 15:6
George (1) 26:18
get (40) 3:14 4:5 6:14 10:12 11:15 23:3 30:3 33:13 41:4 42:23 48:4 59:23 69:3 71:11 75:19 84:19 85:7,9 87:22 92:23 93:2 98:7 100:1 103:11 107:23 108:19 117:18,21 131:6 137:20 138:19 139:10 146:2 147:1,2, 5 176:5 177:13 178:14 181:1
gets (6) 67:22 70:5 72:14 81:11 85:23 119:23
getting (3) 137:11 181:8, 11
give (9) 4:21 40:19 47:20 48:13 49:15 106:17 107:4 153:13 176:2
given (8) 3:1 34:4 60:5,14 106:24 122:5 161:9 169:16
gives (2) 48:15 75:23
giving (1) 44:13
glad (1) 110:12
Global (3) 8:17 9:10 91:2
go (47) 6:22 9:9, 10 11:23 13:9 16:22 20:1 28:15 29:14 31:5 32:2,4 34:12 36:20 48:2 49:24 52:4 53:6,10 54:4 56:11 69:20 79:7 86:16 88:21 94:8,23 95:16 106:21 114:3 125:14 136:15 137:9 138:19 146:2 148:21 156:17 167:22 173:7 174:10 180:9,10 184:10 186:1, 3,5,7
goal (1) 45:13
goals (1) 45:15
goes (12) 23:24 39:20 81:10, 12,13,16,20, 22 85:24 113:6 180:7,7
going (36) 3:8, 15 5:13 8:5 16:10 20:17 26:15 34:18 39:16,17 49:18 50:21 61:4 69:5 71:21 81:7 82:10 84:13 85:12 87:1 88:8 90:22 91:5 97:9,24 114:6,8 115:6 118:7 123:18 150:6 153:23 164:2 180:1,2 181:6
Golden (1) 8:6
gone (3) 130:23 143:22 178:8
good (33) 5:12 6:9 9:6,7 19:10 22:19, 20 23:2,13

26:1 31:21 32:7 40:16 41:1 44:23 45:3 47:16 48:15 49:9 50:18 51:1,2 75:1 76:10 81:1 85:21 87:3 92:11 94:1 96:17 121:17 135:7 158:14
got (14) 9:8 11:22 12:5 20:15 70:14 93:13 95:15 108:18 122:2 124:20 156:15 162:6 169:9 174:23
gotten (2) 20:10 122:1
governing (1) 189:15
grad (2) 8:5,16
graduate (4) 10:9, 15,23 20:3
graduated (2) 7:24 9:1
gram (1) 87:14
great (2) 9:8 151:24
ground (5) 66:12 67:17 159:22 175:23 176:3
group (27) 22:18, 18 23:8,18,21, 22 24:7 25:15, 20 26:6,9,19 27:3 28:21,22 29:8,16,20 30:1 31:4,7 84:19 90:22, 22,23 91:1 176:23
groups (2) 27:11 44:1
group's (1) 29:12
grows (1) 88:23
guard (1) 6:7
guarding (1) 36:2
guess (44) 5:4 17:5 30:22 41:4 50:12 53:23 57:6 58:15 64:22 66:2 67:3 68:2 69:6 70:20 73:15 82:18,19 88:2 89:7 101:3 104:5 105:23 106:1 110:20 114:8 115:16 117:24 132:16 133:14 136:15 140:2 142:12 146:14,17 148:3 149:10 150:2 151:14 164:14 170:10 171:1,3 173:13,21
guessing (1) 114:9
guy (3) 50:2 65:20 99:10

H

H2O (1) 126:13
half (9) 10:1 12:15 13:1,7 15:7 19:19 22:5 25:12 105:20
halfway (1) 24:8
hallway (1) 32:6
hand (2) 47:20 121:9
handle (3) 14:21 42:5 64:4
handles (1) 42:4
handling (3) 14:14 18:6 91:10
hands-off (1) 31:4
hands-on (1) 30:22
hang (1) 154:7
happen (5) 50:21,23 52:13 69:17 183:4
happened (8) 29:21 34:5 52:15 55:17, 24 59:15 84:21 94:21
happening (3) 71:15 82:23 88:5
happens (2) 39:7 98:23
happy (4) 19:12 41:4,6 114:9
hard (14) 84:3 85:17 86:23 99:24 100:4 105:6 130:14 131:24 132:21 134:19 140:23 154:3 162:15 163:12
harder (2) 41:21 113:5
Harman (1) 59:7
H-A-R-M-A-N (1) 59:7
H-A-U-S-E-R (1) 13:14
hazardous (4) 14:14,21 172:13,18
hazards (2) 55:21,23
he (113) 5:12, 15 9:1,4 20:9, 10,12 22:12, 13,15 23:13, 13,15,16 26:21,23 32:23 41:1,4 44:14,14 46:19,21 47:23 49:4,5, 6,6,8,10,11, 11,13 50:2,4, 8,9,11,19,20, 24 51:4,9 52:3,5,5,9,11 54:3 75:22 85:23 86:18 96:21 97:3,4, 9,11,15,15,16, 17 98:11,20 99:10 103:1, 19,23 104:5,8, 9,11,13 108:17,19 109:4 113:19 117:7,7,10 130:20 131:3, 4 132:24,24 143:9 148:17 153:4,5 154:17,17 155:23 157:6 158:3 159:12, 14,16 160:12 173:16,17,18, 22 174:1,2 175:19,22,23 176:3,6,11,12, 15 177:2,3
head (2) 80:7 110:14
heading (1) 137:21
health (1) 175:10
hear (4) 4:21 32:5 94:14 98:24
heard (8) 7:15 9:5 70:14 96:10 165:1 170:20 172:24 173:9
hearsay (1) 167:16
heat (31) 12:12 36:23 37:14, 15,19 38:1,2, 10,18,21 39:3 42:3 58:21 60:19,20 61:22 63:8 64:3,4 74:22 76:5 82:2,24 88:24 89:1 96:24 129:15 133:4 145:24 155:5 159:4
heater (1) 167:14
heating (2) 158:24 179:4
help (13) 16:5 28:15 29:14 32:16 36:8 44:13,19 45:14 46:1 67:8 72:13 118:5 129:20
helped (2) 9:3 90:6
helps (1) 3:17
her (4) 112:11 175:8,9,12
Here (19) 56:2 57:13 104:6 107:1,6 109:7, 18 110:11 119:10,14 139:5,15 141:19 142:12 151:24 158:20, 21 174:10 181:22
hierarchy (1) 93:11
high (9) 7:24 8:2 11:6,19 40:19 64:14, 16 66:22 89:8
higher (11) 11:21 21:1 39:9,13 110:13 113:2, 2,4 154:10 175:15,18

highest (3) 42:8 102:2 166:17
highlight (1) 129:7
highly (3) 46:18 47:6 150:22
Hills (1) 13:20
him (24) 5:14,17 32:22 47:20 49:4,12,24 50:2,7,8,9 52:5 54:4 75:22 95:13 96:18 104:9 122:5,8 130:21 157:5 173:23 176:10 181:2
himself (2) 52:6 95:21
HIP (20) 37:1,10 38:5,7,11 52:11 54:1 57:8 71:18,21 75:8 82:6 90:3 128:16 129:13 155:1, 16 167:14 181:13 182:22
hired (1) 20:5
his (22) 8:23 22:14 47:7,8, 24 49:3 50:1, 6 52:2,6,12 57:5 95:24 97:18 99:11 148:18,19 151:2 157:7 160:19 175:20 177:1
historian (3) 48:8 162:17,18
hole (40) 64:5 84:1 85:4 86:3 88:17,23 102:3 104:6, 21 105:3,4,18 106:11,15,20, 22,24 110:10, 16 111:7,11 122:13,22 124:4,20 125:2,3,6,8, 10,15,23 139:7 147:4,9, 13 148:21 177:22,23 178:13
holes (14) 87:18 89:14,17,23 90:3 100:1,18 129:18 131:13 134:8 169:17 184:1 185:4,12
hood (1) 180:19
Hopefully (1) 138:24
hose (49) 57:21 58:4,23 59:12 63:14 64:10, 11 65:2,5 69:21 70:18, 21 91:14 166:2,3,8 167:2,2 176:18 177:16, 17,20 178:1,3, 4,6,8,10,15, 18 179:7,10, 15,19,20,23, 23 180:2,6,6, 8,15,18,21,24 183:1,16,20 185:20
hoses (15) 57:19 58:1 60:1,18 62:4 63:9,19 65:12 69:7 91:23 92:1,2, 5 166:19 178:17
hose's (1) 167:4
hosing (1) 63:16
hot (7) 37:15 42:5,7 58:21 60:19 68:23 178:23
hottest (1) 42:6
hour (8) 87:2,2, 6 88:3,9 112:7,11,14
hours (15) 6:21 84:11 107:14 108:4,5 110:8 112:14 123:20 124:17,18,21, 22,23 131:3 161:17
house (1) 31:21
housing (1) 145:23
Houston (2) 24:6, 8
How (84) 8:8 10:20,20,22, 23 12:24 13:17 14:10, 21 17:11 19:17 21:7 22:21 24:3 25:9 26:5 27:8 28:6,11 31:1,12 33:23 44:1,13,18 45:14 46:7,21, 22 47:12 48:14,15 50:16,17 51:5 54:23 55:9 59:11 61:3,13 62:8 65:24 70:18 71:20 74:19 75:7,23 77:24 78:16 85:5 87:2,13, 16 94:14 97:9 99:2 101:10, 13 102:6 107:14,17,23 108:18 109:24 123:20 128:23 129:5 151:20, 24 158:14 159:19 162:15 164:9 166:5 171:22 174:15 175:19,22 179:18,19 185:15,19,20, 20
HR (1) 90:18
hundred (1) 40:11
hydroelectric (1) 12:22
hydrogeologists (1) 15:7

I

icon (2) 141:16, 17
ID (1) 17:3
idea (2) 13:8 126:17
ideality (1) 101:13
identification (9) 56:17 73:18 74:3 118:15 127:9 135:12 136:20 148:10 186:18
identified (3) 16:9 19:14 40:17
identify (5) 14:9 16:18 18:3 46:1 129:21
identifying (1) 18:5
idle (8) 33:18 34:10,12,13, 18,24 61:4 71:12
idled (4) 30:14, 17 35:21 61:8
ignore (1) 76:12
Illinois (3) 24:14, 15 26:3
image (4) 119:13 120:21 123:9 124:9
imagine (3) 16:20 125:23 153:17
immediate (2) 54:12 151:2
immediately (3) 47:21 52:19 126:12
imminent (1) 52:20
impact (6) 23:1 47:12,14 76:18,20 123:5
impacts (1) 76:22
impairing (1) 4:20
impart (1) 37:16
implemented (3) 51:22 61:13 84:7
important (4) 74:23 103:5 141:3,4
impression (5) 151:5 168:3 169:9 176:5,9
Incapable (1) 99:18
incentive (1) 23:3
inception (1) 97:3
inch (4) 105:4, 19,20 112:5
inches (7) 17:10 45:6 110:16, 17,18 111:4,18
incident (24) 5:18 84:19 90:6 95:9 99:14 100:21 104:23 135:20 136:8 137:7,24 140:1 143:11 145:1 147:2 148:6 149:19 150:8,9,10,13 168:11 174:18, 19
incineration (1) 14:22

include (1) 51:17
included (2) 145:12 170:1
incomes (2) 21:5, 6
increase (10) 39:2 46:4,5 109:8 114:14, 21 115:2,3,5,6
incredible (1) 95:11
incumbent (4) 53:1,4 55:5 169:12
indicate (3) 76:2 133:13 142:18
indicated (2) 145:8 189:10
indicates (2) 128:1 132:24
indication (1) 78:9
Indirectly (1) 113:1
individual (1) 51:23
industries (2) 9:15 13:12
industry (3) 9:12 22:4 101:10
industry-wide (1) 85:15
information (22) 27:23 49:15 87:11 100:7,8 129:22 130:15 131:1 138:18 139:10 147:24 148:22 150:11 151:2 153:14, 21 156:18 176:18 181:23 182:4 185:14, 19
ingest (1) 24:23
initial (5) 61:22 91:21 149:19 150:1 158:23
initially (4) 32:2 45:23 46:21 158:18
initiated (1) 150:9
inlet (2) 76:9 180:1
inlets (1) 128:21
input (1) 131:6
inputs (1) 129:7
inquiry (1) 148:1
insert (1) 140:24
inserted (2) 141:11,18
inside (4) 40:5 61:23 113:20 133:15
inspect (3) 65:4 69:20 79:12
inspection (4) 40:9 51:6 71:1 84:23
inspections (1) 131:22
install (2) 72:11 91:5
installation (1) 61:22
installing (1) 60:15
instead (1) 3:20
INSTRUCTIONS (1) 189:1
instrument (1) 17:4
instruments (4) 8:22 9:13,15, 16
insulation (8) 132:14 133:1, 14,15 134:9, 20 146:3,6
intended (2) 59:10 77:17
intention (1) 129:3
interact (1) 176:14
interacted (2) 46:23 48:24
interacting (1) 28:17
interaction (6) 22:10 44:11 47:5 57:4 173:21 174:4
interactions (2) 93:22 173:20
interchangeably (1) 38:20
interest (1) 140:22
interested (2) 97:12 176:16
interim (1) 34:21
intermediates (4) 23:18,23 24:4,9
internal (21) 39:4, 7 40:4,9 41:13 42:17 54:18 74:21, 23 76:3,12,17 83:1,6,15 98:6 111:16 129:21 131:22 155:6 170:14
internally (12) 16:9 39:2 40:6 41:13 62:2 82:23 100:13 155:9 181:17,18,19 183:11
internals (1) 129:15
interpass (4) 38:16 42:13 72:3 81:17
interview (2) 16:23 44:3
interviews (1) 84:20
intimately (1) 30:3
into (51) 10:2 12:10 14:7 17:2 20:1 23:24 30:8 36:10 44:2 54:5 57:19 60:6,16 61:4 62:17,21 68:22 70:10, 15 81:10,16, 20 85:12 97:4 101:14,18 106:4 113:20 114:11 116:13, 18,20 119:8 121:10 126:8 127:24 131:6 134:1,13 141:11 155:10 174:14,21 176:1 177:20 178:8,8 180:7, 7,9,10
introduced (1) 97:7
invariably (1) 186:5
investigation (12) 84:19 90:6,8 100:12 104:24 135:20 137:5 144:10 147:3 165:7,9 174:19
investigations (2) 5:18 100:22
involve (1) 10:14
involved (22) 5:18 27:24 30:22 45:19 60:23 63:1 71:7 90:5 94:3 100:11, 20 108:24 137:15 138:4 139:14,19 140:5 154:22 155:3 156:8 174:23 176:21
involvement (5) 91:3 129:16 167:11 173:13, 15
involves (1) 133:4
IP (5) 38:18,21 39:3 41:11 42:3
IPAT (3) 72:3 81:16 135:16
irregular (3) 105:7,18 106:16
irritated (2) 160:14,15
irritation (1) 160:21
Irvine (1) 12:1
isolate (1) 14:9
issue (9) 16:2 89:9 91:19 97:13 101:1 143:11,14 150:15 169:21
issued (5) 143:7, 17 144:5,6,9
issues (5) 15:23 28:14 42:15 149:10 171:23
item (1) 119:13
itself (13) 78:10 80:17,22 118:3 119:8 121:13 127:22 128:4 133:2, 24 178:24 179:1 189:8
Ivory (1) 26:4

J

James (1) 59:7
Janezic (1) 155:24
January (2) 25:15 72:20
Jeff (15) 92:24 94:4,9 95:10, 12,21 96:6,11 97:14 98:10 113:7 148:5 151:6 153:7,20

Jeffries (2) 46:19 47:5
Jersey (3) 32:14 35:5,6
job (31) 6:9 9:1, 10 12:5 13:2, 24 14:8 15:22, 23 16:1,3 19:3 20:13,14, 23 21:3 22:11, 16 26:1 28:7 44:4 47:13 50:24 51:17, 18 94:20 130:12,13,17 148:19 172:5
jobs (2) 15:4 57:13
John (2) 46:19 47:4
joint (1) 24:15
June (8) 137:4, 12,14,14 142:21 143:9 146:16,19
junior (3) 32:18, 20 45:1
just (152) 3:5 4:7,12,17 5:1 6:2,5,10,12, 23 9:20 10:7, 19 12:16,22 13:3 15:13,16 16:3 17:8,10 19:13 20:15 21:17 23:9 28:8,10 29:20 30:2 31:17 32:2,2,4 38:5, 22 39:15 43:7 44:15 45:6 48:3,6 49:11, 17 53:15,21 54:7 55:16 56:11 63:3,22 64:7 66:20 72:12 76:21 78:17 79:21 86:19 87:6,9 89:12 93:21, 21 94:17,21 95:11 96:23, 24 99:11 104:24 106:2 108:13,14,15 110:4 116:15 117:4,13 119:7,9,10,13 120:19 121:1 122:9 123:10, 22 124:9,12, 14 125:21 126:1,4,15,16 127:3,12 128:6 129:13 130:2,11,14 131:2 132:1, 20 134:20 138:5,14 139:10,18 140:22 141:2 142:12 143:3 146:14,18,24 147:14,18 148:7 151:6 153:12 154:1 156:16 157:2, 11,16 158:2,4 159:10 160:18, 24 161:1 162:16 163:16, 19 166:21 167:8 168:21 169:8 170:13 174:19 176:3, 14,16 181:6,7 183:19 184:23 185:7,17 186:3,11
justification (2) 149:14 151:8
justified (1) 151:15

K

keep (4) 44:15 70:7 117:20 176:7
Kelli (1) 35:10
K-E-L-L-I (1) 35:10
kept (1) 97:24
Kerry (8) 56:3 99:9 103:18 108:16 122:2 173:22 174:14 175:1
key (2) 144:13 169:20
kid (1) 44:24
kilograms (3) 145:2,3 147:19
kind (28) 3:16 4:22 6:7 10:6 11:14 27:7 29:12 37:21 38:21 41:19 45:6 68:3 69:11 73:1 78:7,10 81:2 104:2 141:9 146:17 151:20 153:3 158:5 160:15 164:8 167:1 179:11 185:5
King (1) 189:21
Kirk (1) 72:17
knew (16) 20:1,6 21:4 22:11 31:13 34:16, 18 35:18 92:19 93:4 129:5 138:12 167:16 169:10 177:5 181:14
knockout (1) 135:15
knowing (4) 100:5,17 152:14 185:11
knowledge (1) 174:18
knowledgeable (1) 51:3
known (4) 35:24 84:8 92:1 98:13
knows (2) 3:15 52:5
K-O-B (1) 35:10
Kober (1) 35:10

L

lab (2) 8:23 10:15
labeled (4) 72:16 118:18 127:5 136:13
lack (1) 93:18
lacks (1) 49:11
Laguna (1) 13:20
large (3) 59:9 146:15 183:2
larger (2) 122:23 178:10
largest (1) 105:18
last (8) 7:17 26:10 27:13 55:17 86:16 115:18 132:20 143:6
lasted (1) 82:14
lasting (1) 57:18
later (7) 11:15 30:7 32:3 34:9 40:8 184:15,19
lay (1) 74:16
Laying (1) 65:18
leach (1) 14:24
leaching (1) 14:3
lead (2) 49:4 134:13
leads (5) 39:4,9 41:23 42:1 124:7
leak (120) 40:5, 20,22 52:21, 21,22,23,24 53:8 54:22 55:3 58:20,21 59:2,8,9,15, 21 60:19,21 61:21 62:3,6, 13 63:3,22 64:20,21 65:6 66:21 70:14 76:6,21 78:12 81:2 82:24 83:9,24 84:4, 5,7,8,13,16, 23 85:3,8,10 86:8,10,10,14, 17 87:1,1 88:2,7 94:5 95:17 97:16 98:5,8,8,15, 20 100:16 102:18 107:2 112:9 113:9, 15 117:11,14, 17 130:15 131:19,22 133:22 134:3, 4,18 135:1 138:1 142:16, 22 145:14,16, 22 146:1,3,4, 5,9 152:17 153:6 154:8, 19,20,21 155:4,6,9 156:16,19 160:16 165:12, 16,17 167:6 174:6,13 178:2,13,20 179:17 180:11, 15 182:21 183:20 185:18
leakage (26) 66:24 85:15 102:13,14 106:18 107:4, 9 109:15,17, 18 110:6

111:17 113:6, 15 114:1 115:3,4,6 122:15,24 123:3,5,23 124:3,5,11
leaked (2) 174:21 177:21
leaking (18) 40:6, 11 62:17 64:23,24 69:23 84:1 114:19 133:19 146:8 152:10 153:18 154:24 155:9 166:4 185:4,13,15
leaks (86) 5:17, 21 39:5,7 41:13,14 42:1, 10 52:10 53:24 54:8 55:18,21 57:8, 12,14,19 62:15 63:2,20 66:2,4 68:5,6, 6 69:8 71:14, 24 74:21,23 75:6 76:3,12, 13,17,20 82:5, 13,21 83:1,6, 16 84:12 87:22 89:15 99:5,7 101:11 117:13,20 118:3 129:20, 21 130:5 132:5 134:7, 23 147:4 151:17 155:5 156:13,21 160:2 164:24 165:2 167:7,8, 13 168:19 173:2 176:19 177:18 181:13 182:24 183:2, 3,5,10,10 184:1,5,7,13, 16 185:6,11
learn (4) 10:23 36:6 129:17 148:23
learned (2) 92:8 100:6
least (10) 13:7 40:18,19 65:7 75:22 93:23 144:15 147:16 150:21 168:14
leave (4) 13:2 19:1,20 90:22
led (1) 91:21
left (13) 23:6 25:15 35:17 36:1 50:15 56:21 128:18 132:17 143:3 150:10 156:10 159:6 176:11
legal (3) 7:12 171:6,19
less (12) 19:13, 16,19 34:8 59:13,24 64:18 70:20 71:18,18 79:14 145:2
level (8) 66:12, 22 67:17 83:18 136:9,9 158:6 159:22
levy (1) 157:5
lifelong (1) 10:18
lifting (2) 146:3,6
light (3) 66:20 67:3,6
lights (1) 163:21
Like (70) 3:3,4 6:24 7:13 9:2 11:8 12:19 13:8 15:1,6, 13 18:20 19:13 25:14 45:7 49:17 50:8,24 51:15 53:24 55:16 60:14 61:15, 18 63:20 66:6 67:14 72:15 79:9 83:21 87:3 89:11 92:14 93:7 96:17,22 100:10 107:19 108:16 116:14 119:10 128:16 129:23 134:11, 17 138:14,20 139:3 140:20, 22 143:18,18 144:11 148:2, 17 149:10,18, 18 151:7 152:17 154:18 156:2 160:9, 16 161:16 162:17 179:22 183:3 185:17 186:8
liked (4) 22:18 35:18 47:2 91:12
likely (2) 72:8 152:11
limit (6) 46:8 48:5 78:18,19 80:7,8
limitations (1) 45:16
limited (3) 40:23 91:20 115:22
limits (3) 79:22, 24 83:4
line (9) 23:1 67:21 70:2,4 125:7,9,17 128:23 144:24
lines (2) 53:24 154:10
linger (1) 163:17
lingering (1) 163:18
Lion (75) 28:12 29:23 30:10, 13,20 31:19 33:4,9,17,23 34:1,6,19,24 35:15,17 36:4, 11,13,16 37:9, 18 38:8,9,13, 19,21,23 39:6, 13 43:14 44:10,18 45:18,22 46:11,17,19 47:10 55:19 58:20 59:4,11, 12,22 60:8,17, 24 61:13 62:5, 12 63:14 64:10,17 65:10,24 67:12,18 68:2 69:6,8 70:8, 19 71:11,22 77:7 92:13,19 100:19 130:18, 24 136:6 137:8 149:20 177:6
liquid (2) 11:11 179:11
liquids (1) 11:8
list (5) 137:9,13, 18,20 143:18
listed (3) 14:16, 18 141:12
lists (2) 141:23 142:3
literature (1) 101:8
little (16) 3:5 4:8 5:6 27:9 33:5 39:13 44:11 56:19 62:19 122:21 132:18 141:16,17 150:17 154:9 157:15
live (2) 7:24 160:8
lived (2) 8:1,2
living (1) 21:1
localize (1) 178:13
localizing (1) 179:4
locate (3) 57:17, 17 85:3
located (4) 20:15 31:8,20,20
locating (2) 9:18 89:14
location (7) 9:7 59:2 95:4 116:5,8 133:12 152:14
locations (1) 24:5
locked (1) 124:15
locker (1) 132:21
log (2) 95:19 97:14
logbook (1) 95:19
logbooks (1) 163:14
long (28) 12:24 19:17 21:7 24:3 25:9 26:5,14 28:11, 16 56:4 59:12 61:13 62:8 72:4 90:13 91:14 99:9 103:18 106:17 108:16 117:3 154:7 173:22 174:4 175:16, 19 176:2,6
longer (6) 41:9 62:19 90:10 137:13,15 163:19
look (54) 5:21 6:18 9:4 11:8 16:3,23 20:3 22:16,23 34:14 39:18, 21 44:12 46:23 48:16

49:4 60:10 73:8 75:11 85:22 86:18, 21 95:17 101:2 116:18, 20 118:19 119:20 133:7 134:6,7,15,17, 24 137:20 138:7,11 144:3,17 145:13 150:21 151:20 156:18 157:2,12 162:18,19 167:17 168:10, 14 175:24 183:3 186:2,5
looked (12) 5:8, 24 6:3 7:18 14:20 45:13 47:15 56:8 139:2 161:16 175:23 176:3
looking (23) 7:8 40:17 66:22 88:17,19 106:12 115:8, 12 118:20 121:1 122:9 123:24 131:20 138:15 147:18 152:6 154:1 159:10 162:16 163:9 164:1 165:4 186:12
looks (9) 73:1 79:9 105:17 126:11 138:14, 15,20 140:1 152:17
Los (6) 8:1,2,3 20:18 21:1,5
lose (2) 106:7 179:8
loses (1) 68:21
losses (1) 116:3
lost (2) 22:5 89:12
lot (34) 9:7 22:10,14 23:2, 2 30:5 32:1 33:12 40:23 44:17 50:16 59:17 66:13 67:23,24 72:5 76:8 78:23 85:12 86:6 89:3,5 100:5 130:9 135:8 139:21 157:6, 21,22 160:2 163:17,19 164:9 185:23
low (4) 18:10 22:23 77:22 176:7
lower (4) 11:20 28:3 159:8 175:15
lowest (1) 166:16
Ltd (1) 189:20
lunch (5) 4:7 6:15 49:24 71:2,4
Lyle (1) 24:17

M

Macha (2) 132:11,12
made (10) 37:19 42:13 46:6 72:9 85:18 89:7 92:1 101:5 112:20 170:7
magnitude (8) 11:18 52:22 75:6 89:8 145:1 146:9, 14 182:23
main (1) 124:2
Mainly (1) 167:16
maintain (1) 46:8
maintained (1) 110:7
maintenance (19) 29:15 31:24 53:3,5 54:13 55:2 58:15 59:4 63:1 65:15,17,20, 21 67:19 134:11,12 150:15 162:19 184:13
major (3) 18:5 128:21 156:13
make (46) 5:15 7:21 18:20 21:21 25:7 28:2 30:2 33:2,2,3,24 36:5 43:8 51:4 52:12 57:18 61:20 65:5 69:20 84:9 85:22,23 86:1,23 99:12, 23 100:9 104:11 105:24 108:15 109:3, 5 114:6 123:11,22 126:19 138:5 152:3 156:10 169:18 170:9 174:2 183:13, 15 189:7,13
makes (11) 16:6, 15 23:24 24:1 41:20 50:20, 24 87:4,5 101:12,24
making (6) 16:19 24:1 28:3 34:24 65:21 168:10
management (17) 29:24 44:24 45:19 46:11 55:6 91:9,18 92:15 99:10, 13 149:11 151:4,9 169:7, 14 170:16 172:19
manager (25) 28:23 35:22 40:9,21 44:12 46:18,20 52:12 53:2,3 54:3,11 93:15 97:6 98:13,18 130:19,20 143:21 155:21, 24 172:24 173:7,10 175:11
managers (2) 28:17 31:22
manager's (2) 61:17 94:5
manifold (4) 60:2, 18 166:10 180:7
manifolded (1) 60:6
manifolds (1) 166:17
manpower (1) 23:8
manually (1) 119:22
many (11) 13:17 16:21 22:21 44:1 70:18 87:13 107:14, 23 123:20 137:24 168:10
map (1) 17:8
March (2) 90:16 177:10
mark (11) 56:12, 12 73:15,24 118:13 128:6 132:11,12 135:10 136:16 148:4
marked (9) 56:17 73:18 74:3 118:15 127:9 135:12 136:20 148:10 186:18
marker (2) 157:12 158:22
MARKS (1) 189:7
married (3) 20:15,21,22
mass (11) 102:1, 7 107:7,12 109:19,20 111:24 114:22, 24 123:18,19
Master's (4) 8:14 10:4,16 11:22
match (1) 120:3
material (10) 12:19 17:12 27:20 38:3 63:16 70:22 163:24 164:13 167:2,3
materials (4) 24:14 25:10 54:19 135:4
math (5) 87:4,5 110:13 125:21, 21
Matt (3) 176:22 177:4,6
matter (6) 22:21 23:9 35:16 77:7 106:14,16
Maureen (3) 175:7 176:17 177:4
Maureen's (1) 177:3
may (25) 39:11 66:19,21,23 75:3 79:19 93:24 108:24 114:9 132:18 134:2,2 139:16 143:22 147:21 152:3 158:23 168:9, 24 169:1,8

178:14 179:12 184:9 189:16
maybe (21) 6:15, 16 8:24 46:17 48:2 66:16 90:12 93:2,14 94:5 96:22 100:2 108:8, 13 126:1 128:6,14 130:2 143:12 164:19 171:6
me (97) 4:12,17 5:4 6:16 9:1,3, 9 10:19 15:24 20:7 21:3,10 22:24 27:8 28:14 31:1,1 32:1,4,22 35:1 36:6,15 41:2 43:7 44:13,14 45:1, 2,11,19 47:5 48:15 49:15 52:14 53:10 73:14 75:17, 23 85:2 91:12, 22 92:21 93:23 94:9,10 95:2,3,10 99:11,14 101:4 103:18 106:21 108:4 109:12 110:15, 24 114:9 115:13 117:10 118:4,12 122:21,21 123:20 124:8, 15 127:4,13 128:2 130:20 131:1,4 140:19 146:8 149:22 151:23 153:11,13,13, 14,15 155:5 157:3,16 161:3 166:2 169:4,12 172:10 173:4, 6 177:5 186:5, 7,10
mean (47) 5:9 15:12 17:8 18:22 43:16, 24 44:23 46:18 47:4 48:1 55:18 57:24 58:18 69:14 76:14 82:9 88:22 93:4 94:21 98:18 100:19 104:10 113:11 115:13 119:15 120:18 121:17 129:2 130:23 132:2 139:21 144:13 146:2, 4 147:5 150:8, 17 154:12 156:12 157:19 164:7 170:20 171:12 172:13 173:15 177:17 181:15
meaning (4) 31:5 97:9,11,11
means (3) 30:15 79:15 139:2
meant (2) 17:6 42:2
measure (8) 61:10 77:17 78:21,23 80:12 100:15 101:23 177:15
measured (2) 77:1 83:23
measurement (3) 79:2,7 80:1
measurements (2) 75:19 77:15
measures (1) 177:19
measuring (6) 78:7,15,17 83:5 85:10,16
mechanical (1) 129:14
medication (2) 4:18,23
medium (1) 146:15
meet (2) 16:4 23:11
meeting (3) 7:1,8, 20
melt (2) 70:22 178:17
melting (3) 64:5 178:23,24
melts (7) 178:4, 6,9 179:19,21 180:2,5
members (4) 26:18 31:4 136:9 138:4
mentality (1) 169:7
mentioned (4) 6:23 46:24 162:14 168:18
mentioning (1) 41:10
mentor (1) 32:22
message (1) 43:7
met (10) 47:17, 20,23,24 50:1, 2 93:4 175:12 177:6,7
metallurgist (2) 135:5,6
meter (1) 108:23
method (1) 180:22
middle (2) 71:8 180:1
might (19) 18:15, 20 21:6 63:2 67:4 72:13 76:17 88:2 94:2 108:19 117:24 121:4, 10 122:4 147:24 153:23 162:9 167:22 170:6
miles (1) 186:13
Mill (4) 32:14 35:4,14 36:3
M-I-L-L (1) 35:7
Miller (9) 91:18, 21 95:12 96:6 97:21 155:21 175:7 176:17 177:8
milligrams (1) 78:4
mind (4) 6:2 65:7 126:2 156:13
mine (2) 5:12 23:14
Mines (6) 8:7,8, 9,14 9:5 20:10
M-I-N-E-S (1) 8:8
minimize (1) 14:11
minimizes (1) 98:7
minute (2) 18:4 43:6
minutes (4) 107:23 108:4, 5 142:19
missing (4) 118:23 119:1 120:11 126:4
mission (1) 29:16
mist (18) 66:6,7 72:7 77:17,21 78:8,16,21 79:4,16,24 80:8,9,12,16, 17 126:19 171:2
mistake (1) 46:6
Mittel (1) 13:14
M-I-T-T-E-L (1) 13:14
Mittelhauser (10) 13:24 15:5, 10,22 19:17 20:14,24 172:5,8,17
mm-hmm (12) 3:21 9:11 43:1 58:3 61:11 72:19 73:11 74:10 125:4 137:1 172:2 173:24
modified (1) 24:20
modify (1) 122:2
modules (2) 129:11,13
moisture (5) 63:21 64:1,1 66:5,9
molecular (7) 118:23 119:1 120:11,22 121:5,8 152:24
moment (1) 96:24
Monhollen (3) 72:18 74:8 146:21
Monica (1) 8:2
Monique (6) 5:10 6:5 50:7 114:9 116:12 163:4
monitor (4) 39:19 65:9 154:14,17
monitored (1) 77:1
Monitoring (1) 65:20
monitors (3) 66:11 70:1 76:23
Monplx (6) 37:22 38:8,10,10 129:11 133:10
M-O-N-P-L-X (1) 37:23
month (10) 48:3, 21,23 59:14, 19,22,24 64:18 75:22

91:5
monthly (1) 116:7
months (3) 7:17 33:21 40:8
more (40) 11:7 12:14 22:6 27:9 28:3 29:5,7 30:21, 22 33:6 36:23 37:20 41:22 42:4 50:13 52:6 53:23 59:18 63:7 66:2,4 67:6 72:8 74:6 75:23 79:14, 15 82:22 92:13 93:5 113:5,12 115:11 154:9 156:24 163:20 178:11,14 179:3,4
Morocco (1) 151:22
Morses (5) 35:4, 6,7,14 36:3
M-O-R-S-E-S (1) 35:7
Most (14) 20:4 45:18 49:5 50:4 51:3 64:13,21 65:13 78:19 88:15 130:7 135:7 152:11 180:20
mostly (1) 29:9
mothball (1) 34:3
motivation (1) 168:5
move (3) 20:18 65:2 132:21
moved (4) 21:3 24:7,14 127:17
moves (1) 157:7
moving (1) 68:5
much (42) 5:9 7:17 9:16 10:20,21,23 11:20,21 15:3 17:12 33:24 35:19 45:19 46:15,21,22 47:15 48:18 49:23 75:8 78:16 85:5 87:16 90:24 91:10 92:18 93:14 102:6, 10 105:15 106:7 108:18 130:12 149:7 163:11 176:15 179:20 180:12 185:15,19,20, 20
multi- (1) 56:13
multiply (1) 87:6
must (6) 43:2 100:23,24 117:13,17 132:15
mutual (6) 45:11 46:24 90:21 93:7,13,14
my (101) 6:1 8:9 10:13 11:8 14:8 15:4 16:7,8 17:6, 24 20:8,11,11, 18 21:14 22:6, 11,12 25:20 26:12,19 27:3 28:14,21,22, 24,24 29:20, 23 31:3,18,21, 21,23 32:8,12, 12 34:24 35:2 36:12,14 39:18 41:8 43:7 44:5,9, 11 45:9,13,21 47:23 48:5,20 50:6,24 70:12 75:14 76:1 80:7 82:18,19 90:17,18,21, 22,24 91:1,1, 21,22 94:20, 23 96:2 99:21 104:10 110:13 114:6 116:14 124:14 129:20 130:13,16 132:20 134:22 136:7 138:2,6 139:20 140:4 150:2,20 151:5 152:1,9 156:13,15 169:11,11,13 171:3 172:8
myself (6) 13:8 44:8 55:2 97:7 138:5 143:19
mysterious (1) 90:19

N

nail (1) 96:2
name (5) 8:6 13:13 103:14 137:6 138:6
names (1) 26:7
narrow (1) 10:10
narrows (1) 10:2
natural (2) 11:9 12:23
nature (1) 38:22
near (1) 116:9
neat (1) 13:6
necessarily (3) 114:2 169:13 170:13
necessary (2) 59:20 189:12
need (27) 3:11 4:6,7,8,16 16:4 36:7 37:12 42:22 44:16 45:4 52:11,18 53:13 54:3 56:6 69:18 71:10 87:17 115:16 139:6 144:18 155:10, 15 157:3 183:16 185:14
needed (14) 19:4 28:19 31:14, 16 36:7 41:9 44:16,18 45:12 47:16 48:7,19 136:11 147:24
needs (3) 45:17 53:7 55:4
neglecting (1) 124:1
neighboring (2) 63:23 160:13
never (19) 5:17 9:5 49:12 52:15 57:14 64:6 68:2,3 70:14 76:10 78:1 88:23 90:5 98:22,23 99:13 139:17 169:16 177:13
new (14) 25:20 28:10,15,24 32:13 35:5,6 36:6 44:4 91:1 92:8 94:20 129:4 180:3
next (13) 30:18 35:2 40:7 63:5 67:20 124:10 143:17 148:4 157:6 162:8,10,13 180:18
nice (2) 40:13 87:3
nickel (1) 85:1
night (19) 65:13, 15 66:3,14,19 67:2,3,7,7 95:8 96:5 154:13 162:13, 22 163:20 185:23,24 186:1,3
nine (3) 122:16, 19 124:21
nitrogen (1) 109:21
nobody (2) 83:5 131:5
nomenclature (1) 37:13
normal (17) 42:9 60:7,9 68:17 75:21 77:19 89:12 98:4,12 115:9 140:18, 19 143:12 150:8,14 160:3 163:15
normally (9) 39:14 55:15 96:15,20 143:5 144:10, 13 148:19,20
NOTATIONS (1) 189:8
Note (2) 126:12 189:5
noted (1) 104:14
nothing (6) 42:18 46:2 93:19 130:15 142:16 182:19
notice (2) 120:22 160:9
noticing (1) 39:12
notification (1) 171:20
noting (1) 40:2
Now (23) 30:6 37:24 50:5 51:21 80:11 88:21 90:1,2 100:4 103:2

105:22 140:3 142:23 150:23 151:21 155:15 156:19 163:8 169:14 173:16 178:9 180:3 186:4
nuclear (1) 12:23
number (31) 15:14 16:24 21:2,19 29:9 34:4,20 40:3 85:20,22,23 87:3,10,17 89:1 92:5 114:10 115:22 124:12 131:3 136:16 138:19 139:5 142:3 147:15 171:15 175:24 176:3 184:11,19 185:12
numbered (1) 73:24
Numbers (8) 56:16 122:10 132:9 136:19 142:6,9 176:7 177:13
nylon (5) 23:17, 23 24:1,3,9

O

object (2) 160:18 167:23
objection (1) 168:6
objective (2) 74:20 109:2
obligations (1) 170:22
obtain (1) 56:8
obvious (4) 54:22 97:1,8 134:23
obviously (4) 22:20 99:16 121:24 138:16
occasion (2) 68:8 156:9
occasions (1) 155:8
occurred (2) 60:24 96:7
occurring (1) 41:12
October (15) 26:10 90:20 129:24 157:1, 11 162:11 163:2,4,8,9 164:19,20 165:5,6 186:15
odd (1) 106:4
off (16) 4:5 5:6 6:7 41:3 56:21 60:5,13, 14,22 67:4 80:7 94:22 132:14 133:14 163:5 166:18
offer (1) 20:23
offered (2) 9:1 20:14
office (8) 31:21 32:4,9,12,13 94:23 189:10, 11
offices (1) 173:19
official (1) 173:6
officially (2) 90:19 144:6
often (1) 31:12
oil (7) 9:14,17, 18 13:4 20:4 21:20 22:3
Oklahoma (2) 20:16 21:2
old (5) 19:23 28:24 41:7 71:19 90:22
omitted (1) 138:18
once (16) 5:24 16:4 19:14 29:8 31:5,14 75:22 79:1,12 80:15,19 81:8 90:20 179:22 180:5,8
one (72) 3:10, 15,15 4:6 7:16 9:4 11:1 13:15 16:12 19:2 20:2 22:20,22 25:16 26:18 28:15 29:18 41:8,11 45:5 48:3 49:8 51:13 58:19 62:14 67:14 68:4 69:14 75:4,12 77:14 78:1 84:4 88:18 90:23 92:24 97:8 100:6 105:13, 19,19 108:6 116:14 117:18 120:4 122:18 125:1 128:5 133:11 136:12, 13 138:20 140:12 142:3, 7 143:24 147:11,14 154:1 156:24 157:2,12,19 158:20 162:11 164:16 167:20 174:5 177:5 178:19 182:9 184:23
one-page (1) 56:13
ones (8) 65:16 82:14 93:6 104:13 135:7 156:13 180:17 183:6
ongoing (2) 88:2, 8
on-line (2) 77:10, 16
only (41) 19:18 31:6,14 35:23 39:17 40:23 44:1 49:5 54:16 58:22 61:24 62:11, 14 63:9 64:13 65:14,16 75:24 78:20, 24 79:13 81:7, 19 89:6 91:3 92:10 97:8 111:10 115:22 122:7 123:23 132:21 133:13 134:22 135:8 142:2 152:21 153:1 154:15 164:15 169:22
onset (1) 129:21
on-site (4) 32:19 33:7 53:5 65:16
opacity (5) 79:3, 5,14 80:1,15
open (1) 150:11
opening (2) 178:10,11
operate (8) 28:4 45:15 50:16 61:15,18 83:3 129:5 166:6
operated (1) 78:1
operates (2) 48:16 58:24
operating (11) 31:24 39:23 48:10,14 55:7 68:18 83:13 92:7 115:9,10 151:18
operation (2) 33:18 68:18
operational (1) 150:15
operations (10) 30:23 32:20 40:8,21 49:6 53:2 54:10 130:19 151:22 158:2
operator (13) 17:1 49:2,4 53:9 84:11 95:24 98:14 113:8 148:17 149:21 151:1 154:20 169:4
operators (48) 16:23 28:18 32:1 35:24 49:1 50:14,16 52:18 53:1 54:7 55:1 65:4,8,10,14, 17,22 67:19 69:3 92:10,24 93:5,5,12,14 94:4 95:8,14 96:5,11,12 98:24 129:4,5 149:10 151:4, 8 154:13,16 162:19 169:2, 24 173:6,9 181:24 186:1, 4,9
operators' (2) 48:12 149:14
opinion (2) 93:22 151:12
opportunity (1) 32:22
opposed (5) 10:13,21 50:22 53:14 159:23
optimize (1) 28:2
order (7) 85:7 138:19 139:5 144:19 156:10 185:15,15
orders (1) 11:18

organization (1) 20:2
organizations (1) 20:4
organized (1) 29:17
original (6) 46:2 80:23 119:20 127:15 174:12 189:19
originally (4) 18:2 59:4 80:20,21
originated (1) 134:3
originating (1) 14:10
OSHA (1) 148:1
other (50) 3:11, 15,15,16 6:15, 18,21,24 7:8 14:13 15:6 20:11 31:16 50:14 58:10 63:2 67:21 72:18 84:3 86:7 90:23 93:6 95:14,23 96:4,10,12 102:7 107:1 111:12 117:12 121:9 130:2,4 136:13 139:2 155:12 156:11 157:19 158:12 164:13 168:13 172:4,20,21 173:2 174:3 178:19 180:18 182:20
others (4) 54:4 94:9 95:3 184:8
otherwise (1) 149:20
our (15) 15:16 18:19 22:5,8 23:8,21,22 24:7 29:11 30:1 31:4,7 46:1 189:9,10
out (75) 6:10 9:6 14:24 17:17 20:13 22:18 28:1 32:21 33:22 39:9 40:15,17 43:24 45:7 47:3 48:3 49:24,24 60:17 61:21 62:2,23 65:19 68:23 69:3,5, 12 70:21 77:21 78:3,5, 16 79:4,17 80:2,3,10,12, 19,23 81:5,14, 18 82:9 85:20 87:6 89:17,22 100:24 102:18 117:11 124:15 134:7,12 144:12 145:17 146:12 147:23 149:18 152:24 153:16 155:12 156:7 159:2 161:23 173:7 174:6 177:22, 23 178:11 185:22,23 186:1,3,5
outcome (2) 75:13 160:16
outlet (3) 117:11 152:21 153:1
outlets (1) 128:22
outputs (1) 129:8
outside (15) 61:14,24 62:1 80:11 95:16 105:1 131:21 157:5 160:19 172:6, 12 173:11 181:16 183:2,7
outsider (4) 92:14,16,18 97:2
over (13) 3:11 6:22,23 15:24 18:22 24:14 43:12 71:12 80:17 166:3 172:11 177:3,5
overall (5) 9:23 13:22 17:16 39:18 75:23
overdue (1) 96:3
overlap (1) 34:17
overly (2) 93:17, 19
override (2) 98:14,20
overrode (1) 97:21
Overtly (2) 93:20, 21
own (3) 10:20 35:5 37:24
owned (3) 8:22 21:8,13
oxidizing (1) 134:1
oxygen (2) 68:13 109:21
Ozbun (1) 173:14

P

page (22) 56:14 73:8 110:20 121:21,23 124:13 127:12 128:10,18 129:12 138:9 141:20,22 142:16,24 143:6 144:17, 21,23 145:13, 13 189:7
pages (3) 6:11 129:9,10
paid (2) 23:4 41:3
paper (6) 12:17 13:3,7 28:9 49:12 139:24
paragraph (2) 25:24 73:10
parameter (7) 88:16 102:3, 9 113:19 120:23 145:21 159:15
parameters (24) 48:10 84:16 88:21 99:12, 22 101:14,22 103:19,23 104:12 107:1 109:4,4 117:4, 6 119:23 121:16 122:11 139:6 141:10 146:1 169:20, 20 174:2
parentheses (1) 120:14
parking (3) 53:20, 20 157:6
part (54) 6:1 15:2 17:5 20:20 21:14 23:6 27:1,12, 13,21 28:1,21 29:5,7,8 31:17 34:9,14 36:12 39:18 45:18 46:12 62:16 64:21 65:3 67:14 75:14 86:12 90:9 91:2 97:13 98:3 99:14 100:21 112:24 113:21 126:2 130:17 132:23 141:3, 4 146:8 165:11 166:4, 8,10,12,14,19 167:3 168:4, 12 174:19 178:22
participate (3) 135:23 136:3, 6
participated (1) 32:7
particles (1) 164:7
particular (23) 9:12,19 10:6 53:9 54:8 59:18 102:16, 17 105:2 111:15 115:15, 24 116:10 118:4 121:20, 23 126:22 129:7 143:19 147:15 153:20 154:23 170:19
particularly (5) 14:14 59:9 67:18 151:21 160:7
partner (1) 95:24
parts (1) 31:2
pass (21) 81:14, 20 86:14 102:18 104:4 108:19 117:11 121:15,19 122:7,7 127:24,24 128:1,1 134:16 152:12, 13,15,21 153:1
passed (1) 84:11
passing (2) 130:11 131:2
past (1) 25:22
paste (1) 120:20
pasted (2) 120:21 124:9
patch (1) 57:13
pay (2) 167:21 168:20
Pegasys (10)

72:23 73:1 74:11,14,17 76:2,16 82:12, 16,20
people (31) 17:19 21:4 22:14 23:2 29:19 30:23 31:7,13 32:15 35:18,24 52:5 59:20 65:14 67:24 69:15, 20 79:7 84:20 100:11 130:3 134:6,23 140:19,20 149:8 154:15 159:23 160:13 173:10 174:17
per (21) 17:11 18:4 23:4 78:4 87:6 88:3,9,11,14, 15,18 99:13 102:2 107:5, 10,11 108:13 112:7 122:16 123:24 124:7
percent (11) 75:18 79:6, 10,10,10,14, 15 81:15,15 107:16,16
percentage (1) 109:23
perception (1) 151:13
Percy (28) 5:11 47:17,17,20, 21 48:24 49:2, 7,21 50:18 51:2,24 53:1, 9,24 54:7,13 57:5 74:9 92:10 95:2 130:4 131:3 153:9,11,19, 20 165:1
perfect (1) 106:15
perform (3) 39:24 71:21 105:15
performance (5) 44:5 74:18, 24 75:12 83:2
performing (1) 75:24
period (18) 8:20 22:15 63:5,13 64:11,17 69:7 70:9 84:22 92:22 94:17 108:6 112:11, 14,15 149:9 158:19 183:23
perjure (1) 138:5
permanent (4) 58:23 59:10 63:7 64:7
permit (6) 45:23 77:11 78:24 79:18,22 83:4
permits (2) 79:20 126:24
person (12) 20:8 30:9 44:8 50:4 51:4 59:3 70:12 74:16 79:19 173:22 176:15, 22
personable (1) 50:2
personal (2) 93:22 169:8
personally (2) 51:20 182:21
personnel (4) 31:10 67:23 68:9 70:5
perspective (2) 11:5 133:3
pertain (2) 55:20 129:19
pertinent (2) 18:19 138:2
Petroleum (1) 19:24
petroleum-based (1) 25:6
Pezzone (1) 23:14
pH (1) 174:13
PhD (1) 20:6
Phillips (1) 19:24
phone (5) 53:6 108:3 114:7 148:21 149:1
photos (1) 132:13
physical (2) 101:18,21
physically (3) 78:2 85:23 159:14
pi (1) 105:12
pick (6) 10:9 48:6,18 56:20 59:18 148:21
picked (1) 108:14
picture (6) 48:14, 15 75:23 132:22,23 134:15
pictures (7) 76:4 131:12,16,23 133:8 134:9 135:8
piece (2) 12:9 49:12
pilot (1) 24:17
pinpoint (1) 93:17
pipe (3) 52:16 65:19 134:12
pipes (3) 64:3 153:18 154:11
piping (1) 101:12
place (13) 33:23 42:16 58:18 60:20 69:21 94:13 96:6,16 116:20 117:8 134:4 142:23 147:17
places (1) 113:21
plan (4) 24:17 58:23 60:21 64:8
plans (1) 27:21
plant (203) 24:19 28:2,10,12,13, 15,17,23,23 29:18,19,23, 24 30:3,10,17, 20,22,23,24 31:6,10,12,16, 19,22 32:2 33:4 34:3,12, 18 35:4,5,6, 18,22,22,23 36:1,2,8,10, 11,12 39:19, 19,20,22 41:21 44:12, 19,24 45:5,7, 14,18 46:9,11, 18,20,20,22 47:6,8 48:7, 14,15 49:6,7, 18,20 50:17 51:8,9,14,18 52:12,19 53:7, 10,12,13 54:3, 7,11,21 55:8 57:4,5 58:10 60:9,24 61:1, 16 62:16 65:17,18 67:14 68:4,17, 19 71:11,17 72:1,11 75:12, 15,24 76:24, 24 77:7,11,12, 14,19 79:5 80:4,6 81:23, 24 83:2,3,9, 18 84:21 90:7 91:18 92:7,8, 17 93:15 94:5, 8,12 97:4,6, 15,17 98:9,13, 18,19 100:23 101:1 104:22 105:1 112:19, 21 113:11,11 115:9,10,11, 24 128:12,13 129:6 130:17, 19 136:9 140:7 143:21 154:14,24 155:4,14,21 156:10,17,23 158:2,7,10,11, 12,16,17,18, 24 160:4 161:6 162:2, 16 163:13 164:5,5 166:5 168:10 169:2, 15 170:16 172:24 173:7, 10 176:19 181:12 182:9, 12,22 183:2,6, 23 185:23
plants (27) 24:9 27:22 28:4 29:13 31:8 32:17,24 33:1 38:7,10 42:9, 16 45:7 58:19 60:15 65:14 78:19,19 79:11,23 83:12 102:11 137:8 167:6 168:13,13 183:4
plastic (2) 58:1 63:15
plate (1) 38:1
play (3) 44:2 101:14 119:8
plays (1) 113:21
Plaza (1) 32:14
Please (3) 186:15 189:5, 8
plugged (6) 40:12 104:5,

8,9 114:11 121:4
plume (1) 158:24
plus (1) 52:2
pm (1) 186:20
point (18) 23:20 28:7 30:13,14 71:20 76:21 78:15 81:5 90:12 116:10 137:13,18 155:22 157:13 161:7,12 177:5 180:11
pointing (1) 164:10
points (2) 77:2 145:7
pole (1) 22:24
police (6) 161:7, 23 162:1,24 182:11,13
policeman (1) 161:23
policy (1) 173:6
Ponca (1) 20:16
portion (1) 63:24
position (5) 65:5 89:16,21 164:2 179:16
positioned (1) 180:15
positions (1) 91:7
positive (1) 68:23
possible (2) 74:16 153:2
pot (1) 135:15
potential (4) 40:18 55:23 156:16 185:18
potentially (3) 133:19 177:20 184:8
pounds (19) 87:6 107:3,5,18,18 109:9 110:8,9 112:1,6,11,13, 15 122:16 123:24 124:7, 23,24 126:12
power (5) 12:11 51:9 68:16,21 69:1
practice (7) 51:22 55:7 75:14,21 89:12 98:5,11
practices (1) 19:7
precise (1) 103:6
precisely (2) 87:10,12
preclude (1) 29:24
predict (1) 55:22
preliminary (3) 56:14 141:13, 16
preparation (3) 5:10 6:1,20
preparations (1) 34:24
prepare (3) 5:5 6:6,17
present (1) 94:11
presented (2) 98:16,17
preserved (1) 34:3
pressing (1) 53:15
pressure (47) 11:7,10 39:3 41:20 75:15, 17 76:1 83:14, 15,22 98:6 101:18 104:3, 12 107:2 108:20,22,23 111:14,15,16 113:2,5,14,17, 18,22 114:2, 12,15,17,21 115:3,8,20,22, 23 116:1,2,3, 4,8,10 139:8 154:10 166:16 176:6
pressures (9) 11:17,19,21 101:16 103:20 104:15,17 121:18 123:3
pretty (10) 9:16 15:3 47:3 48:18 57:12 90:24 94:1 99:24 102:10 161:2
previous (2) 26:19 47:8
primarily (8) 9:14 12:17 27:18 28:8 35:14 38:15 129:20 179:24
primary (5) 17:13 29:19 45:13 144:12 181:19
principle (1) 90:17
principles (2) 92:4,7
print (2) 6:10 121:2
privileged (1) 7:8
probability (1) 40:19
probably (31) 5:20 6:6 11:18 12:15 13:21 17:10 19:18 20:20 22:5,23 26:12 35:16 39:10 40:11 41:7 47:18 71:18 81:14 94:19 95:5 102:10 103:11 121:23 133:9 134:4 137:17,19 155:19 166:16 172:17 182:17
problem (15) 40:15,18 41:17,18,22, 23 42:9 46:13 53:3 54:22 61:22 70:3 149:20 152:3 173:2
problems (16) 28:13 33:12 37:10 38:12, 24 40:14 41:10 45:23 49:21 54:9 57:16 59:18 75:3 153:21 168:11 184:9
procedure (6) 14:3 59:21 65:3 78:22 84:7 189:15
procedures (3) 55:8,9 143:13
process (45) 4:19 12:7 15:2,5, 10,23,23 16:3, 24 17:3,18 25:2 38:23 39:19 46:7 50:19 51:3 60:3 68:20 81:5 82:22 84:6 89:10 101:16,22 104:11,20 106:8 107:1 109:4 113:3 117:6 122:11 124:1 128:13, 22 147:1 151:18 155:8, 10 166:18 169:20 180:9, 10 184:15
processes (1) 186:2
processing (1) 27:19
producing (1) 116:16
product (5) 24:22 25:5,7 66:8 178:18
production (19) 21:20 24:19 33:15 39:21 45:15 46:5,9 48:16 89:12 112:24 113:2, 4 114:10,17 115:15,19,21 116:15 172:19
products (3) 24:2, 2 26:8
professionals (2) 15:6 29:9
professor (2) 8:23 20:9
professors (1) 20:11
program (6) 10:9, 22,23 18:9,9 27:20
programs (1) 10:15
progress (2) 76:13 143:9
progressing (1) 39:13
project (7) 10:10 15:16 16:2,12 17:9 24:16,19
projects (3) 14:13 21:19 27:24
prompted (4) 13:2 22:1 36:15 75:11
propanediol (4) 24:22,24 25:5,7
proper (4) 21:23 23:19 55:6 69:21
properly (3) 18:6 65:5 77:16
proportion (2) 114:14 125:11

proportional (3) 109:16 113:23 123:1
protocol (1) 140:18
proud (1) 19:3
provide (6) 29:12 46:5,7 128:11 139:22 158:13
provided (4) 8:21 13:11 23:22 30:19
provides (1) 189:15
pull (3) 104:16 115:14 152:2
pump (7) 60:4,6, 10,10,16 166:12 174:6
pumps (1) 60:11
pure (1) 25:5
purpose (8) 16:17 27:22 62:6 70:24 76:14,15 167:1,4
purposely (1) 46:3
pursue (1) 49:13
push (4) 50:17 51:12 100:4 113:5
pushed (1) 99:24
pushing (1) 53:11
put (18) 10:19 11:5 17:15 18:7,8 19:5 25:20,20 30:15 33:23 58:18 60:20 128:6 139:5 145:6 147:17 180:18 183:20
putting (5) 36:17 62:23 64:5 135:24 158:18

Q

quadruple (2) 125:13,24
qualified (1) 146:19
qualitative (3) 79:2,7 80:1
qualitatively (1) 79:12
quantify (3) 80:14 82:21 185:16
quantities (6) 138:8 170:23 171:1,4 182:2 185:7
quantity (13) 102:6 126:21, 23 145:19 170:12,21 171:8,10,11, 13,18 172:1,2
quarter (11) 26:13 30:12 31:5,14 34:14 43:3 71:9 105:4,20 183:22,22
question (14) 4:11,16 5:2 30:4 52:8 102:8 104:17 124:10 125:1 150:2 152:9, 22 171:3,6
questions (9) 3:8, 9 4:19,21 6:8 32:5 56:20 181:7,11
quick (1) 56:6
quicker (3) 154:6 163:17 164:9
quickest (1) 149:3
quite (2) 9:3 69:1

R

R&D (7) 20:1,4, 15 21:18 28:21 29:5,7
rack (1) 145:15
ran (1) 107:20
range (4) 174:21 175:15,15,18
Rapp (1) 170:1
rate (33) 42:21 66:24 88:9 98:1 102:13 106:18 107:4, 9 109:14,15, 17,18,24 110:6 111:17 112:19,20,23 113:15 114:1, 3,18 115:3,6, 10,15,19 122:15 123:1, 3,5 124:3,6
rates (18) 39:21 46:9 48:16,17 97:16,22,24 98:6,15 113:14 123:23 159:1 161:6,8, 13 162:1,6 184:20
rather (3) 32:8 62:23 147:17
rating (4) 144:18, 20,24 145:7
ratings (1) 170:14
ratio (1) 87:5
react (2) 63:21 126:19
reacting (2) 66:9 179:3
reaction (5) 64:2 78:13 94:5 95:12 154:19
reacts (2) 66:5 126:13
read (7) 137:10, 22,22,23,23 138:2 148:8
READING (2) 189:1,4
ready (2) 144:5,8
real (3) 52:17 56:6 101:14
reality (2) 26:11 76:23
realization (1) 85:19
realize (4) 5:23 79:18 111:1 171:3
realizing (1) 86:20
really (27) 3:12 6:17 15:11 17:2 23:5 46:11,15 47:9, 14 57:14 58:17 62:24 75:7 77:24 78:1 89:16 92:8 96:24 117:13 127:19 129:19 132:1 134:21 136:3 157:20 170:5 173:20
reason (22) 23:6 25:19 30:17 34:14 63:19 74:22 75:10 82:20 89:6 98:21 118:5 153:6 156:14 159:14 167:20 168:8,9,15 170:8 175:24 178:22 189:6
reasonable (1) 116:4
reasonably (1) 116:11
reasons (1) 21:2
reassigned (2) 34:10 35:22
reassuring (1) 76:3
recalculate (1) 174:20
recall (25) 5:19 14:17 18:12 33:9 39:10 62:11,14 63:9 67:12 70:11 82:11,18 93:24 94:2 97:23 98:4 117:9 137:11 139:20 147:21 148:14 156:2, 12 172:22 174:4
receive (1) 176:9
received (1) 122:4
recent (3) 25:22 129:23 130:7
recently (1) 56:9
recess (4) 43:9 55:14 71:4 118:9
recollect (3) 148:2 170:5,7
recollecting (1) 147:18
recollection (3) 73:12 122:6 140:5
recollections (1) 170:2
recommend (1) 156:9
recommendation (2) 97:18 98:14
recommendations (1) 20:11
recommended (3) 9:4 20:7 156:3
record (5) 5:7 56:6 126:1 157:4 164:6
recorded (2) 48:11 162:17
recorders (1) 115:23
records (1) 184:13

recover (1) 37:15
Red (75) 28:12 29:23 30:10, 13,20 31:19 33:3,9,17,23 34:1,6,18,24 35:15,17 36:4, 11,13,16 37:9, 17 38:8,9,12, 19,20,23 39:6, 13 43:14 44:10,17 45:18,22 46:11,17,19 47:10 55:19 58:20 59:4,11, 12,22 60:8,17, 24 61:13 62:5, 12 63:14 64:10,17 65:10,24 67:12,18 68:2 69:6,8 70:8, 19 71:11,22 77:7 92:13,19 100:19 130:18, 23 136:6 137:8 149:19 177:6
reduce (2) 113:14,14
reduced (1) 162:7
reduces (4) 98:6, 8 178:6,12
reference (2) 133:8,12
referenced (1) 135:18
referring (7) 68:7 73:22 75:16 103:1 144:23 159:5 171:2
refers (1) 132:24
refineries (8) 13:12 14:1,5, 9,15,17 16:23 18:12
refinery (13) 14:8 16:15,21 18:23 30:18, 19 33:12,15, 21 67:20,22 70:3,5
reflect (5) 67:4, 10 127:19 128:7 170:15
reflected (8) 111:18 113:17 114:12 121:8 127:23 141:14,15,19
reflecting (2) 102:16 121:21
reflection (1) 163:21
reflects (2) 127:15 142:10
refractory (1) 54:20
refused (1) 95:16
regardless (2) 163:12 164:4
regards (1) 101:13
regeneration (1) 33:4
registered (1) 37:23
regular (5) 5:11 42:11 47:22 65:4 97:24
regulation (1) 14:19
regulations (2) 14:2,16
regulatory (4) 80:5 181:16 182:3 183:8
relate (3) 15:4 50:6 131:4
related (5) 11:20 14:14 21:19 91:4,23
relations (1) 27:19
relationship (12) 31:22 32:8 40:1 44:22 47:11,17 48:1 57:7 91:9 92:11 96:18 97:7
relative (1) 85:24
release (27) 88:4, 9,11,14,15,17, 20 107:13,17 108:12 123:13 124:20 138:8 141:23 144:14 145:1,2,8,10, 19 152:16,20 153:22 160:9 170:11,17 182:15
released (11) 102:2 112:10 142:2,10,23 143:1 144:12, 19 147:5 153:2 179:20
releasing (1) 179:3
relevant (3) 11:14 18:24 19:1
reliability (1) 29:15
relocate (1) 26:2
relocated (1) 26:3
rely (3) 49:14 65:22 135:7
relying (1) 91:14
remained (2) 24:13 37:6
remains (1) 112:2
remember (30) 11:3 17:9 23:12 25:19 33:19 34:15 49:3 58:18 59:14 60:1 62:9 72:21 93:24 94:7,8 95:7,14,22 102:20,23 103:23 117:3 132:19 135:15 141:8 156:14 168:21,22 169:2 186:6
remind (1) 4:5
remove (1) 63:6
reorganizations (1) 22:4
repair (13) 54:24 55:4,10 57:18 60:21 62:3,12 63:8,10 64:8 89:4 132:16 184:17
repaired (5) 55:5 117:21 156:17 184:14,19
repairing (1) 63:3
repairs (6) 54:2, 5 58:23 61:20 63:2 156:11
repeat (2) 4:12 177:12
rephrase (2) 4:12 149:23
replace (1) 42:22
replaced (1) 70:23
replacement (1) 91:4
report (34) 10:13 17:9 73:1,6, 23 75:7 82:16 92:17 99:2,2 100:12 135:21 137:6,7,24 140:1 141:14 149:17,19,21, 22 150:1,1,4, 7,8,9,13,14 168:11,16 169:13,14 181:19
reportable (14) 89:9 126:21, 23 144:15 169:11 170:12, 17 171:4,8 182:1 183:12, 14,19 185:7
reported (7) 109:1 142:10 167:13 181:20 182:3,5,6
reporter (3) 3:9, 18,23
reporting (13) 94:4 167:17, 20,22 168:5,7, 19 181:12,15, 15,16,18 183:7
reports (5) 99:15 136:8 144:11 167:18 168:14
represent (3) 128:21,22 134:16
representation (4) 123:9,10 128:12,13
represented (1) 120:3
representing (1) 7:4
represents (1) 129:11
requested (1) 116:13
requesting (1) 155:3
requests (1) 116:14
require (2) 77:12 148:20
required (3) 54:2 79:11 183:7
requires (4) 41:22 53:12 78:22 145:17
research (4) 7:12, 12 19:22 27:12
reservoir (1) 60:11
reservoirs (1) 9:18

residents (1) 68:1
resource (2) 29:13 33:7
resources (6) 30:1 40:22 41:2 54:17 55:6 59:20
respect (7) 47:1 93:7,8,9,13, 15,18
respectively (2) 56:17 136:20
respects (1) 49:10
respond (2) 130:21 148:1
responsibilities (18) 26:12 27:5, 14 43:16,18, 19,21 44:2,6, 20 45:9 52:1, 3,4,7 93:9 94:19 130:18
responsibility (4) 28:6 45:21 51:8 90:24
responsible (2) 61:1 156:22
rest (3) 68:19 75:19 81:21
restart (2) 34:4 36:2
restarted (4) 34:7 40:12 157:11 158:5
restarting (4) 30:16 34:5 113:12 158:2
restricts (2) 41:19 179:15
restroom (1) 118:8
result (5) 52:23 120:1 133:24 155:13 174:13
resulted (1) 174:13
results (1) 139:11
retired (3) 23:13 31:15 34:20
retirement (1) 23:3
retrofitted (1) 72:1
return (4) 149:1 189:9,17,19
revelation (1) 85:14
reverse (1) 125:20
review (2) 6:2 143:18
reviewed (2) 5:5, 22
reviews (2) 44:5 101:8
revised (1) 174:15
revision (1) 144:7
rid (1) 98:7
Right (195) 5:9 6:15 7:2 8:13 13:10 15:3,3, 19,21 16:11 17:22 21:4 22:22 27:2 29:4 30:11,18 37:5,6 41:15, 15 42:23 43:4, 23 46:14,14, 16 48:10 49:2 51:19,23 52:14,22 53:23 56:10, 21 57:15 59:23 61:1 62:7,22,24,24 63:12 66:1,3 67:4,5,5,8,20 69:19 76:19 77:8 79:21 80:7,14,24,24, 24 82:8 83:7 85:7 86:15 87:19,23 88:5, 9 89:18 90:10, 15 92:3 93:5 99:17 100:19 102:22 104:13, 20 105:5,6 106:3,6,9,13 107:9,24 108:1,23 109:3,18 110:11,12,12 111:4,10,14, 23 112:2,17 113:7,8,12 114:19 117:13, 22 119:3,12, 17 120:2,8,15, 18,24 121:3,9, 13,15,15 122:5,13 123:8,17 124:23 125:16, 16 126:7 128:18,20 131:8,10 132:16 133:16 136:2,4 137:15 139:5 140:12,14 141:21,24 142:4,6,8,16 143:23 144:20 145:22 146:24 150:7 151:21 153:10 154:4, 5,5,9 157:23 158:21,22,23, 23 159:7,9 162:11 164:4, 11,21 166:6,8, 9,15,23 167:4 168:11 169:18, 19,19 174:8,9, 11 175:4 177:13,16 178:5,13,16 179:6,21 180:13,13,16, 18 182:15,16 185:7,16
ringing (1) 73:4
River (3) 157:5 174:14,22
Road (1) 157:5
role (26) 16:7,9 17:6 29:11,12 30:6 31:2,3 39:18 43:14 54:6 55:1 57:5 65:20 75:14 83:8 99:4 136:7 138:3 156:7 172:8 173:17 175:8,9 177:1, 3
roles (11) 43:16, 18,19,21 44:2, 6,20 45:9,13 52:6 65:16
room (2) 32:3 94:24
rotating (1) 54:20
Rouge (1) 156:15
rough (3) 114:13, 21 146:17
roughly (1) 27:23
round (2) 48:21 87:3
routine (1) 75:14
row (1) 50:10
Rule (1) 189:15
rumors (1) 33:16
run (10) 40:18 55:21 58:23 60:1 64:18 68:22 73:6 87:21 119:19 165:12
running (7) 10:11 76:16 98:10 112:19, 21 154:11 162:16
rupture (1) 52:23
ruptures (2) 52:16 180:6

S

S02 (38) 33:2 39:9 40:1 60:14 66:9,10, 11 68:13 69:24 70:1,7, 10 74:19 77:4, 5,16 79:21,24 80:4 81:8,11, 13,15,19,21, 24 82:3,8,9, 10 83:14 102:1,8 107:16,18 108:18 110:9 171:2
S03 (92) 33:2 63:20,21 64:1, 2,23 66:2,4,5, 8,9,14 67:13 68:13 69:24, 24 70:7,10 74:20 77:8 78:10,10,13, 21 79:3,16,20 80:7,9,18,20 81:4,11,12,12, 16,17 82:1,4, 7,10 83:5,14 102:1,8 107:2, 16,18 108:18 109:24 110:6, 8 111:24 112:10,16 114:15,18,22 115:5,7 124:24 126:12, 18 151:17 152:10,16,16, 18,21 153:3,5, 9,23,24 159:13,18,20 160:2,5,21,24 161:2,2 163:18 164:1, 3 170:11 171:2 179:2 182:2,15,21
Sabine (1) 24:10
saddened (1)

22:14
safe (3) 51:16, 21 154:17
safety (3) 51:19 154:16 175:10
said (26) 6:10, 11 16:4 22:7 39:22 44:14 45:1,4 83:17 96:6,10,13,23 97:22 100:4 124:21 151:7 155:14 160:14 168:24 169:1, 5 170:3 179:22 181:14 182:13
sale (1) 33:16
same (27) 26:9 31:20 36:16, 19 37:6,17 38:7 42:14 43:13,17,20 60:18 69:19 88:23 106:17 109:8 110:5,7 111:13 112:3, 4 118:19 119:19 139:6 153:23 168:6 173:19
sample (2) 78:2 102:15
Santa (1) 8:1
SAR (1) 33:5
save (1) 140:20
saved (1) 140:17
saw (8) 48:6 86:17 92:9 97:15 131:16 144:10 153:5 165:5
saying (15) 3:21 51:14 80:11 86:2 105:14 122:18 125:2 139:17 147:18, 19 151:9 159:17 168:21, 22 170:5
scenario (1) 108:10
schedule (3) 40:9, 21 51:5
scheduled (2) 40:7 63:6
school (11) 7:24 8:2,5,6,13,16 9:5,6 19:22 20:10 79:8
School's (1) 8:6
scrambling (2) 33:22 34:2
screen (1) 186:12
screens (1) 48:12
se (1) 99:13
seal (1) 69:4
second (15) 17:5 20:24 41:16, 23 102:5,8 107:5,10,11 122:17 123:24 124:7 128:10 157:13 184:17
secondary (1) 74:20
seconds (7) 88:12,13 107:3,13,20 124:13,17
section (6) 84:24 104:21 105:14 152:12 179:7, 24
see (78) 5:22 6:3 22:14 29:2 31:1 48:10,11 49:16 52:21 53:9,13 54:6 55:3 64:24 66:11,14,15, 18,23 67:1,9 70:1 74:19 75:16 76:4,12 77:20 79:13 81:2 82:7,8, 10,23 83:9 87:8 89:8 91:12,13 92:21 107:8 108:7 109:12, 15 110:19 113:16,22 115:18 119:23 120:13 125:1 126:11 127:3 132:2 133:1, 20 135:9 138:15 141:15 142:23 143:5 144:2 145:18 150:5 151:23 152:10 154:18, 20 157:14,15 163:10,13 164:9,16 177:21 183:9, 20 186:10,11
seeing (9) 66:7, 7,8 72:21 146:7 155:13 158:10,11 182:20
seem (2) 125:8 138:12
seems (2) 73:22 138:7
seen (14) 5:20 72:24 76:6 90:1 105:14 121:20 137:5 151:17 181:23 182:21,24 183:1,5 185:3
segregate (2) 17:14 19:6
selected (1) 136:10
selective (1) 11:12
selectively (1) 63:22
self-motivated (1) 10:21
send (2) 149:21 154:20
sending (4) 75:17 148:18 150:4,14
senior (1) 15:13
sense (8) 16:6 71:23 72:1 85:22,23 86:1, 23 123:11
sent (2) 43:7 122:5
separate (1) 78:9
September (1) 129:24
service (5) 21:11, 14 23:4 37:21 38:2
services (1) 13:12
servicing (1) 38:11
set (1) 120:13
several (4) 18:4 40:11 130:24 152:2
severely (1) 33:15
shape (4) 105:7 106:4,15,16
she (12) 6:9,10 33:10,20 34:8, 10 51:9 151:11 175:10, 11,12 182:10
sheet (23) 55:24 83:10 99:8 102:10,12 110:11 119:20 121:12 126:9, 14 139:1 142:5 144:1 145:18 146:22, 24 147:7 189:6,9,12,13, 17,19
sheets (1) 55:16
shell (3) 37:18 38:9 40:6
shine (1) 67:10
shining (1) 67:3
short (2) 28:16 158:19
shortly (3) 82:17 150:9 161:18
should (27) 35:16 37:24 43:20 45:2 52:9,18 61:23 73:15 77:20, 20 109:5 120:5 124:6 125:14 140:23 142:6 144:16 148:17 152:1 162:22 165:20, 22,23 180:9, 10 182:2,10
shouldn't (2) 128:14 165:19
shoveled (1) 45:5
show (21) 10:20 17:10 72:15 73:14,21,23 113:4 118:12 119:9 127:3 132:1 136:12 141:1 143:24 148:3 151:23 153:13 156:24 162:9 163:2,14
showed (2) 83:10 99:9
showing (3) 129:14 143:20 157:1
shown (5) 120:1, 23 128:19 131:12 145:5
shows (4) 103:15 122:15,19 144:4
shut (24) 51:5,9, 13,21 52:18 53:8,10,11,13, 15 57:14 62:8

98:9 113:10 145:15 155:4, 11,15 156:2,9, 19 157:10 161:6,14
shutdown (14) 40:7,15 51:12 52:10 53:11,14 54:3, 5 61:19 62:1, 5,12 63:6 164:23
shutdowns (1) 183:24
shuts (2) 68:16, 20
shutting (2) 113:11 154:23
sick (1) 50:9
side (3) 63:1 97:8 133:3
sign (1) 189:8
signature (1) 143:8
signed (1) 189:17
significant (1) 159:21
Significantly (2) 19:16 21:1
SIGNING (1) 189:1
signs (1) 134:7
similar (5) 29:21 35:15 36:3 102:11 139:2
Simoneaux (11) 92:24 94:4 148:5 153:4 157:4 159:12 160:12 161:22 162:4 170:1 182:13
simple (5) 33:3 84:15 128:11, 12 168:9
simplified (2) 128:20 129:6
simulate (1) 27:20
simulations (1) 10:14
since (12) 19:24 21:13 22:21 31:15 36:1 50:11,15 64:22 89:13 110:24 115:3 151:21
single (6) 36:10, 20 72:2 127:16 128:2 183:20
sit (2) 32:3 181:22
site (9) 31:5 67:14,15 129:1 137:12 145:17 167:12 173:14 174:17
sites (1) 29:20
situation (12) 68:22,24 92:20 94:9 95:17,23 98:16,18 116:1 131:6 162:23 186:6
situations (3) 68:15 69:16 95:3
six-months (1) 71:19
size (28) 16:20 27:23 84:1,16 85:9 86:3 87:18 88:16, 22 90:2 100:1, 17 105:9 106:11,24 111:7,7,11 128:4 142:15 144:24 147:3, 4,13 169:16 179:16 185:4, 12
skills (1) 22:12
sky (2) 66:23 163:22
slight (1) 68:18
slightly (3) 122:11 123:4, 4
slow (1) 113:13
slowing (1) 113:13
slowly (2) 40:7 76:13
small (12) 13:18, 19 19:7 25:23 29:21 72:12 125:23 145:1, 8 146:5,15 182:24
smaller (2) 105:19 123:16
smoke (2) 79:8 163:18
snapshot (1) 49:17
snow (2) 45:5,6
sociable (1) 176:15
sock (1) 69:13
socks (1) 69:11
solid (1) 12:9
solidification (1) 14:23
solution (4) 59:10 64:7 89:2,4
Solutions (4) 25:18 28:19 91:2 92:2
solve (1) 46:12
solvent (1) 11:11
some (84) 5:16 6:16,22 9:15 10:13 14:15, 16 19:21 20:6, 10 23:4 27:14 28:9,13,13,18 29:19 34:15 36:7,16,19 37:10 40:18 45:22,23 49:9, 10 55:9,19 56:19 61:20 64:23 68:13 69:5,7 71:11, 24 72:9,18 75:16 77:21 79:16 82:18 86:4 90:12 93:5 94:3,3, 18 95:7,20 100:2 103:18, 20 109:20,21, 21 132:13 134:10,11,12 138:17 140:19, 20 149:9,13, 17 151:3 153:13 159:24 160:10,13 161:7 163:10 164:6 174:3 176:6 178:3, 20 183:24 184:5,6,10 186:2
somebody (24) 6:13 10:19 16:4 32:16 49:19 70:15 74:13 86:17, 24 89:20 94:15 95:5 96:21,23 98:8 105:17 108:10 122:9 139:24 140:15 143:15 147:18 174:11 175:2
somehow (1) 146:12
someplace (1) 138:15
something (31) 36:6 40:2 44:17 50:12 51:16 56:6 65:2 83:17 89:10 95:1 96:22 100:22 109:9 115:17 118:3 139:1 154:18 157:19 160:3 162:23 163:18 164:6 171:24 176:13 182:10,12,17 184:12 186:5, 7,10
sometime (4) 26:13 30:11 63:17 90:16
sometimes (23) 15:12,15 19:4 33:5 38:14,19 39:4 44:9 45:1 52:3 62:15,18 84:9 100:9 105:24 129:6 131:22 134:23 153:22 154:3 156:20 168:8 178:17
somewhere (3) 34:13 71:9 140:18
soon (1) 158:24
sorry (9) 9:10 38:14 39:10 56:5 72:21 88:13 89:21 137:2 144:22
sort (21) 3:14 17:17 19:14 21:17 30:9 43:13 44:21 46:12 51:11 57:4 58:14 100:2 102:15 105:9 106:4 117:18 128:17 130:11 147:9, 22 166:21
sound (1) 43:4
Sounds (6) 9:2 11:14,16 15:1

19:13 87:3
source (18) 17:7 19:14 60:18 85:3 113:18 131:18 134:3 142:16 146:3 157:14,16,18 158:5 164:24 165:13,16 174:20 180:11
sources (7) 14:10 16:14 17:1,11,13 18:3,6
speak (1) 150:20
specialist (2) 118:5 175:13
specializes (1) 54:19
specialties (1) 10:3
specialty (1) 10:18
specific (10) 61:16 62:6 150:21 167:4 171:1,8,10,13, 19 186:6
specifically (10) 6:18 24:7 55:20 60:4 63:4 95:2,6 155:1,16 170:5
speculation (3) 167:24 168:15 169:5
spell (1) 8:8
spend (4) 41:2 46:22 48:21 89:3
spending (1) 6:21
spent (6) 33:4 48:22 68:10, 12,14 91:4
spoke (1) 22:17
spot (1) 138:8
spread (17) 55:16,24 83:10 99:8 102:10,12 119:20 121:12 126:8,14 139:1 142:5 144:1 145:18 146:22,24 147:7
spring (1) 168:18
square (7) 105:13 106:15,22 110:18,22,22 125:11
stack (22) 39:10, 12 76:18 77:2, 3,18,19 78:3, 6,12 79:3,4, 12 80:2,3,10, 13,14,19 158:6,20 159:8
staff (2) 22:6 31:24
stainless (6) 38:1 42:14 63:18 64:10,12,15
stand (1) 34:1
standard (4) 5:1 55:9 78:5 140:6
standardized (1) 127:2
standards (1) 14:6
standpoint (1) 17:18
star (1) 106:16
start (20) 3:16 5:4 7:23 11:7 15:24 23:20 24:11 25:13, 16 26:2 28:16 31:18 64:4 68:23 84:8,14 101:3 117:15 166:3 172:10
started (25) 23:19 27:6 28:5 32:17 36:1 38:19 43:2 61:4 63:17 71:7,13, 15 82:15,19 86:13,14 87:1 97:15,16 117:13,21,24 129:1 157:10 182:9
starting (2) 106:10 127:20
starts (7) 68:21 76:13 83:1 105:14 158:17, 24 159:22
start-up (2) 28:13 158:16
state (9) 11:9 30:15 31:9 77:14 80:5 100:10 126:24 127:2 128:8
stated (2) 145:10,10
statement (2) 170:7 181:3
states (1) 73:6
status (1) 144:3
statute (7) 16:2 17:20 126:22 170:19 171:9, 19 172:1
statutes (2) 126:24 171:5
stayed (1) 109:7
stays (1) 88:23
steam (17) 12:13 152:17,18 153:18,22,24 154:6,8,9,11 155:7 157:14, 18 163:16,19 164:10,13
steel (8) 37:19 38:1 42:14 63:18 64:10, 12,15 134:21
steered (1) 19:15
step (3) 118:7 143:17 150:6
stepping (1) 3:16
Still (27) 9:7 10:7,8 20:21, 22 26:9,23 29:11 39:14 42:14 47:22 52:1 76:22 86:4 88:5 91:2 92:4 94:18,18 130:17,22,23 137:16 146:11 156:21 163:10 185:10
stomach (1) 50:8
stone (1) 43:22
stop (12) 4:8 42:17,18 43:6 51:17,18 53:18,21 63:20 157:12 158:21 165:8
stopped (1) 62:3
story (1) 28:16
Street (1) 189:21
stress (2) 42:8 45:6
strike (6) 6:16 15:24 91:13 172:10 174:23 185:7
Stripped (1) 132:14
stripping (1) 133:1
strong (2) 59:16 60:13
stuck (3) 35:20, 21 41:8
studies (4) 12:17 13:3,7 28:9
study (2) 11:6 82:12
stuff (3) 45:2 48:2 71:11
subject (3) 11:6 133:6,7
subpoena (1) 7:21
subsidiary (1) 22:8
substitute (1) 25:6
subtopic (1) 14:19
success (1) 184:20
successful (3) 19:10 184:4,6
successfully (1) 184:14
suck (7) 57:19 63:22,23 166:18 177:18 178:11 180:21
sucked (4) 177:20 178:15 180:3,3
sucking (5) 62:20 63:20, 24 178:1,23
suction (2) 178:7 179:12
sudden (1) 179:24
sugars (2) 24:21, 23
suggest (1) 58:12
suggested (3) 22:16 58:9 59:3
sulfates (11) 39:1 41:12,24 133:20,23 134:1,5,8,14, 18,20
sulfur (3) 33:2 158:18,19
sulfuric (20) 11:20 27:15, 22 28:6 32:17 33:3 59:16,16 64:1 68:11,12 78:4,8,10,13, 16,17 80:21, 22 126:19
sum (1) 142:10

summary (1)
140:22
super (1) 167:14
supercritical (2)
11:5,17
supervision (2)
54:10 151:2
supervisor (16)
20:9 22:7,11
23:17 35:1
36:15 44:9,11
53:5 54:12
58:16 59:5
90:18,18
148:18 149:22
supervisors (1)
92:14
support (12)
23:22 28:23
29:15 35:3,4,
12 45:14 50:5
52:12 54:4
151:21 185:5
supporting (4)
31:8,18
34:19 117:16
supposed (11)
23:9 65:18
112:12 120:4
166:6 167:17
181:15 182:5
183:3,4,10
Sure (29) 6:12
13:23 16:11
18:14,17
20:17 40:10
43:8 50:1,13
52:2 65:5
69:21 72:24
88:6 104:11
109:3 118:2
123:22 127:1
138:5 139:18
151:24 158:14
159:18 160:24
161:1 171:5
174:2
surface (1) 133:2
surprised (1)
46:21
surprisingly (1)
40:20
surrounding (3)
67:23 68:1
160:10
surrounds (1)
159:2
survey (2) 74:12
75:17
surveys (2)
75:15 116:7
survive (1) 21:5
susceptible (3)
38:22 64:14,
15
suspected (1)
161:2
sustain (1) 18:10
switch (2) 63:18
71:12
switched (4)
24:13 43:12
64:9,12
system (28) 22:9
58:4,7,9,12,
14 59:12 60:3
61:9 62:17,21
63:15 64:10
91:14 116:22
166:2,10,13,
22,24 167:8,9
176:18 177:16
178:8,10
180:24 183:16

T

Tabor (1) 93:2
take (18) 4:5
5:21 10:2,17
12:19,19
33:24 35:12
44:21 49:24
60:23 61:19
62:1 69:8
71:2 90:7
95:17 105:9
taken (7) 60:22
76:4 95:13
96:6 121:10
133:14 157:5
takes (4) 40:22
52:3,6 101:18
taking (4) 12:9,
19 24:20 40:14
talk (3) 47:22
90:13 136:16
talked (16) 7:7
35:1 63:11
66:13 117:5
136:2 138:22
139:7 140:16
142:6 147:7
160:12 173:23
174:1 177:11
181:24
talking (19) 3:11
4:24 5:15
6:23 49:19
57:3 59:13
71:14 81:3
82:13 130:2,4
140:11 148:7
158:21 166:7
174:16 176:10
177:14
tank (4) 60:6,10,
10 174:6
tankcar (2)
145:15,15
tanks (4) 60:4,
16 67:21
166:12
taps (1) 16:21
tasks (1) 45:20
Tate (1) 24:16
TCLP (1) 14:2
teach (3) 10:22,
24 69:15
teaching (1)
129:3
team (3) 46:12
136:10 138:4
technical (6)
23:22 28:14
29:14 33:7
36:7 46:6
technically (9) 6:2
21:8 26:10
45:21 51:7,8
92:17 118:22
137:16
technology (8)
13:6 26:19,
21,23 27:3,6
90:10 152:1
telephone (1)
149:3
tells (2) 153:11
169:4
temperature (15)
11:7,10 42:5,
7 64:14,16
83:22 101:20
104:12 107:2
108:20,21
115:20 135:2
179:1
temperatures (8)
11:21 103:20
104:3,15,16
111:15 121:18
123:4
temporarily (6)
58:23 59:1,8,
11 60:2,17
temporary (10)
61:10,17
63:10 64:11
65:19 67:13
69:6 70:19
92:2,3
ten (21) 40:10
79:6,10,14,15
110:23 111:6,
8,19,22 112:1
122:22 123:2,
2 124:5,6,22,
22,23 125:5,8
tendencies (1)
60:13
tendency (1)
59:17
tends (3) 39:2
42:8 163:17
tension (1) 151:4
tenure (3) 31:23
48:20 96:2
term (1) 92:3
terminated (1)
22:15
terms (3) 44:23
49:14 161:17
test (7) 18:8,9
72:23 74:17
76:14,16 82:20
testified (4)
97:17 159:12
160:12 165:1
testifies (1) 153:4
testify (1) 157:4
testimony (6)
157:9 160:23
161:9,22
167:19 185:9
tests (2) 40:3,18
Texas (4) 24:7,7,
10,10
text (1) 43:7
than (39) 6:15,
18,21 7:8
19:8,19 21:2
30:24 32:8
34:8 39:13
41:9 49:10
50:14 52:6
59:13,24
62:23 64:18
67:7 70:20
71:19 79:14,
15 93:6 124:5
125:9 130:2,4
145:2,2
147:17 157:15
159:8 163:19
172:4,21
175:16 182:20
Thank (3) 5:1
55:13 184:22
thanking (1)

75:17
Thanks (1) 7:19
their (12) 19:7 26:7 45:15 54:9 55:7 93:9 153:21 154:19 160:14 167:15 170:2 174:15
them (47) 4:19 8:19 12:5 18:9 22:22 23:2,5 24:21, 21 31:6 32:10, 16 33:13 37:24 42:10 44:14,24 45:14 46:23 53:6 54:15 55:9 57:17,17 64:5 65:8 75:13 82:7,19 91:13,21 104:1 118:6 130:6 135:22 136:16,16 137:10 139:19 148:18 152:5 155:10 156:22 170:9 184:10 186:8,9
themselves (3) 54:16 65:10 90:7
theoretical (1) 83:21
there (202) 4:11, 20 5:7,16 7:9 9:12 10:5 12:6 14:15,16 15:6,10 19:20 21:4,19 22:2, 4 23:1 26:10 28:9 29:10,11 30:4 31:13,14, 23 32:4,5,8, 15,16 33:5,16 34:9,17 35:23 36:22 37:4 38:13 39:1,7 40:4,5,6,11, 20 42:17,18 46:2 47:19,20 48:2,20 50:11, 14 52:2,9 53:3,24 54:8, 8 57:7,13 60:2 61:12,21 63:2 65:1,21 67:21,23,24 68:8,16 69:1, 4,19,20 74:21 77:6,9,10,21 78:18,18 79:2, 3,15 80:8 81:11 82:5,9, 9,10 83:9 84:12 85:11 86:4,15 89:1 90:20 92:5,9 93:6,14,18 94:16,21 95:6, 8,13 96:9 97:2,13 98:15, 21 100:5 102:17 103:9 108:22,23 109:20,21,21 113:9,21 114:13 115:12, 17,22 117:17 120:4 126:3 130:20,24 133:22,23 134:23 137:23 138:3,6 140:6 141:11,17,18, 19,22 142:6, 23 143:10 144:7,16 145:24 146:16 147:3 149:7,9, 13,17,24 150:2 151:7 152:2,19 153:17,18,22 154:15,16 155:12 158:12, 14,19,23 160:8,8,9 162:8,22 164:5,15 165:6,8,8,17 170:10,14,23 171:3,7,10,12, 24 173:18 174:3 176:22 180:17 183:17 184:13,16 185:13 186:11
therefor (1) 189:6
therefore (3) 75:4 145:6 178:12
thesis (5) 10:10, 12,17 11:1,8
they (208) 10:22 11:7 13:17,19 14:11,18 16:8, 10,11 17:7,21 18:2,3,3,6,7 19:22 20:1,5 22:22 23:3 24:22,23 27:7, 8,18 28:19 29:14,20 30:13,14,17, 18 31:5,12 32:3,4,15 33:12,16,21 34:21 35:21 36:7,7 37:11 38:1 44:4 45:1,2,2 47:2 50:17 52:4,19 53:10 54:16 55:2 57:16,17, 18,22 58:2 59:12 60:17 61:4,23,24 62:5,8 65:15, 24 66:17 68:3, 7,9 69:7,17 70:10,12,15, 18,21 72:5,11 76:13 77:12 79:8,21 84:8 87:17 89:15, 19,21 90:13 91:10 93:8,9 94:10 95:2 96:1,8,13 97:23 99:1 108:13,14 117:18,20,24 118:4 120:19 121:4,5,6 122:1 124:20 125:19 127:17 130:5,5 132:2 133:2,15 135:9 137:8 138:21,24 139:1,3,4,6,9, 9 142:8 143:14 144:4, 18 146:2,9,11, 12,24 147:1,6 149:10 151:9, 15,20 153:12, 13,15,18 154:18,20,20 155:4,8,10 156:2,5,9,16 157:9,11 158:2,4,12,15 165:2,12,12, 15,16,18,22, 23,23 167:6, 16,19,21 168:15,16,19 170:7,16 174:15 179:8 180:17,19,21, 22 181:14 182:2,4,17 184:4,6,9,10, 14,15,16,18 185:10 186:4,6
thing (15) 3:10 40:13 46:24 75:4 76:10 84:3 94:22 98:12 111:10 113:8,8,13 133:13 135:8 147:9
things (20) 6:22, 24 10:6 45:20 47:15 63:20 69:14 83:21 91:10 92:6 100:6 108:16 131:4 134:11 144:11 149:11 152:2 162:17 181:7 186:11
think (87) 6:5 7:4 13:1,15, 19,22 14:3 15:7 18:15 19:18 25:1 27:2 33:10,20 34:7 41:6 44:15 45:6 48:22,23 49:6, 23 50:10 51:15,16,18 52:4 55:11 58:1 59:15 64:6 66:15,16 88:12 91:5 92:10 93:6,10 95:1,10,18,20 97:4 99:9 105:20 112:11 116:12,14 117:15 126:3, 24 128:7,24 132:15 139:16 147:19 148:6, 16,19 149:13 150:6 151:15 152:8 155:20 157:6,9 158:14 161:11 162:10 166:1 167:20 171:18 172:17,20 173:17 174:7 175:11 176:12

177:3 179:14 181:4,8 182:14 184:21 185:8,9 186:14
thinks (1) 51:9
third (3) 81:14 113:19 129:9
third-party (2) 77:13,14
though (17) 3:23 6:1 13:6 26:8 29:22 37:13 42:12 48:13 92:9 113:3 115:4 123:3 129:5 137:16 143:12 145:5 167:6
thought (8) 17:1 18:2 47:15 52:9 66:17 153:9 161:15 183:7
thoughts (1) 20:24
thousand (2) 18:4 186:12
thousands (1) 28:16
thousandth (1) 87:14
three (14) 8:24 11:18,18 17:10 22:4,6 25:12 50:10 63:13 70:8 113:21 122:13 129:11,13
three-month (1) 17:9
throat (2) 160:14, 22
throughout (1) 115:23
time (97) 6:3 7:14,16 8:19 13:4 14:1 21:8 22:3,7,9, 15 23:10,17 24:6,9 25:17 28:9 32:17 33:8,11 34:17, 23 35:3 40:23 44:1 45:5 46:19,21 47:19 49:8 53:21 55:12 56:3 58:19 59:19,23 61:2, 14,16 62:11 63:5,9,13 64:11,17 67:13 70:22, 22 71:17,19 81:10,22 82:11,16 84:6, 22 86:16,18 88:11,14,15, 18 89:3 91:1, 22 92:22 94:12,17 97:12 100:7,8 102:2 103:17 104:17 115:16 129:16 132:20 138:3 139:19 148:23 149:9 151:9,10 152:7,19 153:23 158:20 161:11 169:6 174:1 175:10, 12 177:7 180:5 182:24 184:18,19
times (23) 65:1 86:6 89:5 105:12 110:23 111:6,8,19,22 112:1 122:13, 16,19,22 123:2,2 124:5, 6 125:5,8 130:24 135:9 180:19
title (6) 11:1,4 15:9,12,15 49:4
titles (2) 15:11 177:4
today (5) 4:20 5:6 6:14 7:19 181:22
together (2) 72:5 135:24
token (1) 69:19
told (15) 5:10,14, 17 44:14 47:5 49:7 50:6 51:16 94:24 95:5,6,10 102:21 153:15 155:10
tolerate (1) 93:18
Tom (11) 91:17, 20 95:12,16 96:6,10,16 97:21 146:21 155:21 177:7
Tony (1) 23:14
took (11) 20:13, 23 23:2 50:9 59:22 62:5 94:10,12 96:16 153:5 177:3
tool (2) 75:1 129:3
top (8) 72:17 80:7 119:6,7 120:7 121:7 137:6 152:12
topic (1) 150:22
total (14) 88:4, 20 102:14 107:11,12,17 108:12 109:20 111:21 112:13 114:24 123:18, 19 124:20
totaled (1) 142:8
totally (2) 36:5 47:11
totem (1) 22:24
touched (1) 166:1
tough (1) 22:3
tour (1) 27:14
towards (7) 26:13 27:13 33:10,17 128:17 155:19 167:9
Tower (15) 26:4 36:22 57:20 58:24 60:7,16 72:4,8 80:17 81:17,19 166:11,15 178:9 180:8
towers (2) 60:12 186:2
town (1) 20:19
toxicity (1) 14:2
tracking (1) 144:4
trademarked (1) 37:24
traditionally (1) 33:1
trail (1) 139:24
trailer (1) 173:19
trained (2) 79:8 93:8
training (4) 171:22 172:12,15,21
transcribed (1) 189:16
transcript (2) 189:4,8
transfer (4) 28:20, 22 90:16 91:7
transferred (5) 21:23,24 26:11 90:12,23
transformed (1) 36:9
transition (4) 26:14,16 71:10 90:14
transitioned (1) 156:7
transitioning (2) 26:16 147:23
translates (1) 107:14
transmitters (2) 115:23 116:2
trap (1) 53:16
travel (1) 48:5
traveling (3) 7:17 67:13 145:14
travels (1) 145:16
treat (3) 18:4 19:8,14
treated (2) 45:1 92:13
treatment (3) 16:16 17:15 19:5
tree (2) 158:22 159:6
tremendous (1) 52:24
trends (3) 40:17 48:16 49:16
tried (8) 48:2 57:18 92:18 97:3,6 100:3 130:5 184:18
trigger (1) 170:24
triggers (1) 170:22
trouble (1) 89:13
true (1) 172:10
truly (1) 128:22
trust (2) 41:2 149:8
trusting (1) 153:21
truth (2) 11:3 35:16
try (39) 3:17 4:4, 4 14:8,9 17:23 24:17 28:1 34:15 40:24 42:19, 20,20 45:17 53:6,17,19,21 55:22 56:20 57:17 61:20

65:9 69:14,18 75:2,2 78:16 86:16 87:8 89:4 99:24 106:7 109:12 115:16 149:23 164:24 177:18 180:19
trying (29) 6:6 16:22 17:20 19:8 32:10 33:22 34:2 37:15 46:4,8 48:3 57:16 86:20 87:7 89:3 91:22 93:10 101:5 105:23 121:24 132:19 140:3 152:2 155:11 178:10,12 179:17 180:23 185:8
TSCA (6) 170:18,21,22 171:8,19,24
tube (2) 37:18 38:9
tubes (3) 40:5, 10,12
tuned (1) 115:11
turbines (3) 12:11,12,13
turn (2) 48:21 157:3
turnaround (14) 29:15 40:23, 24 76:7 97:5, 6 129:23 130:8 131:7, 13,16 155:23 157:8 177:9
turned (2) 9:6 22:18
turns (1) 50:17
twice (3) 79:1 110:10 125:22
two (48) 5:7 10:1,1 12:15 13:1,6 18:5 19:19 21:5,6 24:5,8 26:9 27:10,10 29:20 30:16 31:2,22 35:3 38:24 41:1,10 45:18 48:22 50:10 52:2 57:9 65:14,14 71:15 82:14 83:23 84:15, 16 88:21 115:18 116:2 136:12 140:12 141:23 142:6, 9,11 144:24 149:8 154:15 180:17
two-year (1) 183:23
type (23) 18:10 36:14,16,19 37:11,20 38:7, 10,24 39:20 41:16 45:20 55:17 67:17 68:24 83:11 86:21,22 100:16 118:20 135:1 158:17 178:24
types (4) 27:16 41:10 141:23 180:17
typical (5) 9:24 10:16 31:2 60:14 102:9
typically (2) 81:22 102:6

U

UCLA (1) 8:23
Ultimately (2) 17:12 39:4
Um (1) 121:15
unaccountable (1) 185:20
uncertain (7) 84:16 86:12 88:19 99:1 102:8 105:23 185:21
uncertainties (6) 85:20 86:5, 21 87:9 89:2 100:14
uncertainty (3) 86:7 102:3 147:12
uncontrolled (1) 19:9
under (20) 4:22 29:2,3 49:8 59:1 68:17,18 112:6 113:18 115:9 117:19, 20 126:22 141:13 142:2 144:3 170:22 171:4,8 176:6
underestimate (1) 45:24
undergrad (2) 8:15 9:20
undergraduate (1) 8:4
underneath (1) 134:16
understand (9) 4:12 11:2 49:18 80:8 105:22 108:18 117:19 132:6 169:7
understanding (14) 45:11 47:1 50:19 57:6,10, 21 90:21 106:11,13 132:4 147:12 171:7,24 185:10
understands (1) 49:7
understood (4) 4:16 104:11 123:22 179:14
unforeseeable (1) 69:16
unique (1) 92:19
unit (8) 16:22, 22 27:3 88:11, 14,15,18 102:2
University (2) 8:3, 11
unknown (2) 88:18,21
unknowns (1) 84:15
unless (6) 20:5 52:14 84:2 142:8 165:23 180:6
unlike (1) 92:13
unlikely (1) 86:14
unscheduled (1) 40:14
unsuccessful (1) 184:17
until (11) 5:24 24:5 26:10 27:11 30:11 40:13 63:5 90:20 98:8 150:11 165:16
unusual (19) 39:15 40:2 46:18 47:6 50:9 79:16 97:5 150:5,7, 16,18,20,22 157:20,24 158:1 159:4,9 186:10
unusually (1) 72:4
up (41) 25:5 31:10,11 36:1, 17 54:15 56:20 58:7 63:23 81:13 85:3 88:3,8 101:1,9 104:16 113:6, 6 146:3,11 148:21 152:2 157:10 158:17, 24 159:1 165:16,20,21, 23 170:9 175:15,16,23 177:18 178:15, 18 179:5,7,10 182:9
updated (2) 144:5,8
upon (5) 53:4 54:21 55:5 84:22 90:7
upstream (1) 116:2
us (9) 6:14 7:20 15:7,15 16:5 28:4 30:3 103:10 163:14
use (21) 12:20 24:18 27:22 36:12 38:20 53:19,20 58:9 59:12 63:19 75:1 83:12 99:22 107:19 108:2 109:5 124:14,15 127:20 152:4 180:21
used (35) 12:10, 12 14:20 20:9 25:6,8 38:15 63:15 68:10 70:19 85:14 99:12 102:13 103:21 111:9, 20 119:10,14 121:16 124:8, 13 126:9 130:19 139:1, 4,9,13 140:7 141:5,10 155:7 166:17

177:4,17 180:22
useful (1) 47:3
uses (2) 135:6 147:11
using (15) 11:8 27:19 55:24 61:9 63:9 91:14 92:5 103:19 104:13 120:2 121:13 123:8,12 124:19 126:6
usually (16) 10:9 39:1 41:1 42:9 48:24 72:5 84:4 88:23 94:22 137:7 138:3,4 139:21 154:14 158:16 186:7
utilities (3) 30:19 33:23 48:17
utility (1) 12:20

V

vacation (1) 23:4
vacuum (12) 59:1 62:16 68:18 166:2,14,17, 22,24 179:6,8, 11,18
valuable (2) 22:21 33:6
value (6) 84:22 88:19 92:9 121:4 125:5,14
values (1) 109:1
valves (1) 50:18
vapor (3) 67:11 163:10,19
vapors (2) 60:4 67:4
varies (2) 65:17 80:4
variety (2) 11:12 24:1
various (4) 39:20 82:3 135:7 171:4
vary (1) 180:4
verification (1) 95:15
verified (1) 98:2
verify (5) 18:10 96:4,9 110:24 154:21
versus (1) 124:7
vessel (3) 72:12 101:17 166:15
vessels (2) 87:18 169:17
Victoria (1) 24:10
video (22) 151:23 152:6, 7,10 153:5,13 156:24 157:1, 7,14 160:24 162:8,10 163:2,9,13 165:5,6 182:8, 8,18 186:15
videoing (1) 158:3
videos (1) 182:20
view (1) 45:10
viewing (1) 152:10
virus (1) 50:8
visible (9) 65:8 66:2,4,19 77:23 79:5 146:10 163:21, 23
visit (2) 186:1,4
visited (3) 31:12, 16 47:18
visual (3) 79:6 132:7 146:18
visually (10) 64:24 66:10 67:10 70:1 84:2 121:1 135:9 146:9 152:17,23
volume (1) 17:16
volunteered (1) 28:14

W

wait (5) 40:13 56:5 62:18 101:6 137:2
waiting (3) 4:23 36:2 50:23
walked (2) 70:10, 15
want (18) 5:21 7:6 19:5 43:7 44:13 61:14 70:6 87:13 108:15 109:10 123:22 132:8 138:5 139:18 141:7 167:21 168:19 186:7
wanted (6) 6:3 20:1 46:4 87:16 99:11 149:22
warm (1) 59:19
warranted (1) 51:10
waste (6) 14:14 17:18 155:5 156:21 172:13, 19
wastes (1) 14:21
wastewater (10) 14:6,8,12 16:14,16,19 17:2,14,16 18:5
wasting (1) 91:22
watch (3) 3:11 69:11,13
watched (1) 182:7
water (12) 12:13 14:23 19:13 25:3 64:1,2 68:13 78:14 126:19 155:6, 9 179:3
way (36) 3:6 4:19 7:19 14:7,23 16:15, 19 29:17 32:11 37:7 39:23 44:5 45:10,10 47:9 51:13 55:4 58:22 59:8 62:2 64:7 68:5 80:24 83:16 90:23 91:10 103:9 108:9 115:14 136:7 140:2, 21 149:6 163:24 179:15 183:9
ways (4) 14:16, 21 28:2 90:19
we (190) 3:10, 11,16 4:5,8 5:2,6 7:20,22 11:1 12:17 13:21 15:5 16:4 17:13 18:8 19:5 21:4 22:10 24:15,18,18 28:9,10 29:22 30:4,14,15 31:3,3,13 32:19 33:4,13, 22 34:4,18,18 35:5 36:9 37:7,14,18,24, 24 38:8,23,24 39:6,12,14,14 40:3,10,12,13, 13,17,17,24 41:6 42:20,21, 22 45:5,23 46:4,6,7 47:21,22 49:23,23 50:5 51:14,16 54:17,21,22 55:9,21,21 56:5,21 57:3 58:20,22 59:18,20 60:1 61:7,18,18,19, 20,21 62:1,15, 16,18 63:17, 18 64:6 65:14 66:11 67:20 68:11,14 69:14 70:1,2 71:8,14 72:9 73:15 75:1 76:4,6,7,12, 23 77:2 79:4 80:15,16 81:2 82:13 83:9 86:24 90:9,13 92:4 101:3,7, 8,9,10 103:11 107:17 109:12, 24 110:2,4,19 115:18 116:7, 12 118:20 122:24 123:18 125:14 127:6 131:22 135:18 136:16 138:22 139:6,24 140:2,3,10,16, 22 142:5,12 143:20,21 145:15 147:7 148:3,6 155:6, 13 158:21 161:10,11,11, 17 162:11,18 163:21 166:1 172:18 173:19, 23 174:1 176:14 177:11, 14 181:8
weather (2) 45:8 59:19
week (4) 31:16 48:3 62:10 94:16
weekly (1) 47:23

weeks (4) 23:4 41:1 59:13 63:14
weight (9) 107:16,16 118:23 119:2 120:11,23 121:5,8 152:24
WEINER (26) 4:2 7:2,5 56:2 102:23 103:1, 4,11 116:18 122:18 151:11 158:1 160:18 161:10,15 162:3,10 164:18,22 167:23 168:6 171:12 174:9 181:6,10 184:21
weld (1) 62:2
welded (2) 61:23, 24
went (14) 8:1,3 19:21 28:8,15 31:14 34:13 36:18,24 47:20 116:13 132:20 149:7 176:12
weren't (7) 22:22 89:16,21 91:8 136:3,5 165:2
wetted (1) 134:20
whatever (14) 44:5,15 45:4 48:18 85:1,19 97:11 120:20 148:22 157:21 168:8 171:22 178:7 180:2
whenever (1) 4:6
white (5) 66:17 131:23 133:17 163:10,24
whole (7) 16:15 48:21,22 87:22 104:2 114:3 169:21
wholly-owned (1) 22:8
wide (2) 137:9 143:18
wife (3) 20:18 43:7 55:12
Wilcox (1) 189:20
Wilmington (9) 22:17 23:12 24:6 26:5 48:5 83:19 104:19 174:12 189:21
wind (5) 65:2 69:11,13,15 160:11
wintertime (1) 59:16
wise (1) 20:20
within (13) 22:11 27:11 30:16 33:20 41:6 44:7 45:15 48:4 54:17,23 83:3 181:17 189:17
without (8) 49:19 100:17 108:9 122:10 123:7 133:8 185:9,11
WITNESS (22) 43:6 55:13, 15 56:3,10,22 73:9 98:22 102:21 103:3, 14 116:17,21 118:7 122:20 126:5 128:9 158:4 161:13, 18 162:14 171:15
witnessed (1) 96:1
wondering (2) 127:12 138:12
word (2) 13:15 78:1
worded (1) 179:13
work (26) 8:15 10:15 11:14, 19,20 12:24 14:8,20 15:23 18:13 23:8 24:3 25:9 27:16 30:21 40:24 41:21 44:8 47:2 53:19 113:5 136:8 145:17 160:8 167:15 177:4
worked (14) 8:4, 23 11:24 12:16 13:10 14:13 16:13 19:22 20:12, 13 27:10 33:10 45:10 47:3
workers (1) 68:3
working (25) 12:7 15:2 25:16 28:5 29:2,3 31:22 32:7 33:9 43:17 44:21 47:10, 16 48:1 49:22 71:13 77:16 91:8 92:6,23 96:5,18 129:1 131:3 172:6
works (3) 3:6 32:13 90:19
worried (3) 71:20, 23,24
worry (1) 82:24
worse (1) 86:10
worthwhile (1) 92:21
Wow (1) 135:3
write (1) 3:10
written (7) 43:22 44:3 45:12 95:18,20 126:14 139:23
wrong (12) 39:16, 17 46:2 119:4 120:19,21 123:10 124:9 141:7 150:2,5 179:13
wrote (3) 97:14 112:11 126:17

Y

year (11) 19:18 23:4 26:11 30:16 34:8,8 35:17 61:3,7 79:1 129:24
yearly (1) 77:12
years (33) 8:5, 24 10:1 12:16 13:1,7 14:4 15:14 18:22 19:19 21:9,10, 12,12,15 22:2, 5,6,13 23:3 25:12 34:4,20 50:12,15 52:2 57:9 71:15 82:14 115:18 156:20 175:12 177:5
yellow (1) 120:9
yesterday (4) 5:24 6:22 84:11 102:21
yourself (1) 10:24
yup (1) 73:11

Z

zero (1) 145:7

0

0.00034 (1) 106:22
00034 (1) 122:24
00323 (1) 122:23
00345 (1) 110:22
00347 (1) 111:6
0088 (2) 107:5 124:7
0176 (1) 109:14
07 (1) 47:18
0801 (2) 122:16 124:7

1

1 (28) 56:12,13, 16 101:4 103:3 111:9, 20,22 112:6, 18 113:16 118:21,24 119:11,13,16 120:9,14 122:19,23 124:3,5 125:6, 10 138:23 140:11,13,16
1,440 (1) 108:4
1.1 (1) 147:19
1.16 (1) 110:16
1/16 (2) 110:17 111:5
1/16-inch (2) 111:19 112:5
10 (2) 148:9 150:22
10/27 (1) 182:8
100 (1) 13:22
11 (7) 136:24 137:4,12,14 143:9 186:16, 17
1100 (1) 84:11
11th (2) 137:14 142:21
13 (1) 152:7
1330 (1) 189:21
145 (3) 107:3, 18 112:1
1450 (2) 112:6, 15
15 (5) 110:17

136:17 142:24 145:13,13
16 (2) 144:21,23
17 (2) 144:17,22
19 (3) 107:15 136:13,17
19801 (1) 189:21
1990 (1) 21:16
1994 (1) 21:22
1st (13) 94:2 95:20 102:18 104:4 108:19 117:11 122:7 148:6 152:12, 13,15,21 153:1

2

2 (5) 56:12,15, 17 103:2 174:7
2.3 (1) 110:13
20 (7) 18:22 75:18 79:10 136:14,17 141:20,22
20,000 (2) 20:17, 19
2001 (3) 24:5, 12 25:11
2003 (2) 25:11, 13
2004 (7) 25:14, 15 27:6,11,17 29:6 30:6
2006 (13) 27:11, 17 28:6 29:3, 6,7 30:6,7,8, 10,21 31:19 47:18
2008 (2) 39:12 61:7
2009 (8) 33:11, 14 34:12,21 36:8,9 61:7,8
2010 (16) 30:11, 21 31:19 34:14,16 43:3 71:8,9 102:24 103:15 117:12 129:2 155:19, 19 156:19 183:22
2011 (17) 34:7 48:23 72:22 73:7,22 74:8 76:8 82:12 97:4 117:21 127:21 137:3 138:16 139:15 155:23 156:20 177:9
2012 (19) 26:11, 14 29:3 30:8 72:20 90:16, 20 94:3,18 137:4,12,14 138:16 143:9 146:16,19 147:21 168:18 183:22
2013 (4) 131:9 157:2 163:9 164:21
23 (2) 136:14,17
24 (4) 21:12 108:5 110:8 112:14
24-hour (4) 108:6 112:10, 14,15
26 (1) 72:20
27 (1) 157:1
27th (3) 157:11 164:20 165:5
28 (1) 163:9
28th (6) 162:13 163:2,8 164:19 165:6 186:15
290 (2) 110:7,8
2nd (4) 121:15, 19 122:7 127:24

3

3 (2) 73:16,17
30 (4) 45:6 50:11,14 189:17
302-655-0477 (1) 189:22
30e (1) 189:15
30-some (1) 50:15
315 (3) 127:5, 12 142:19
317 (2) 129:10, 11
318 (6) 124:23, 24 126:12 127:5 129:10, 12
31st (2) 162:11 163:4
33 (1) 50:13
34 (1) 50:13
35,496 (1) 124:16
350 (1) 158:22
38 (1) 107:18
3rd (3) 127:24 128:1 134:16

4

4 (2) 74:1,2
4.5 (1) 145:3
4:48 (1) 186:19
400 (1) 178:21
40-some (1) 22:13
45 (1) 145:2
4th (1) 128:1

5

5 (33) 118:13, 14,24 119:1,7, 24 120:1,6,7, 16,22 121:7 122:4,19,20, 23 123:10,13, 13,19,21 124:2,4,8,16, 19 125:2,8 126:3,11 140:13,17 145:14
50 (1) 70:20
51 (1) 157:12

6

6 (4) 72:22 127:7,8 145:14
60 (2) 107:21 108:1
600 (1) 178:22
625 (1) 73:8
634 (1) 72:16

7

7 (1) 135:11
76 (1) 110:9
77 (1) 125:19

8

8 (8) 73:7 136:17,19 137:3,3 138:11 142:21 145:11
81 (1) 8:14
83 (1) 124:13
86 (1) 8:14
86,400 (3) 107:3, 13,20
866 (1) 73:24
874 (1) 73:24
8th (3) 82:12 136:24 139:15

9

9 (12) 73:22 74:8 136:18, 20,23 137:2 138:7,20 141:12,17,20, 22
9.86 (2) 124:17, 18
900 (1) 132:9
902 (1) 132:10
93 (1) 81:15
94 (1) 21:16
95 (1) 81:15
99.2 (1) 81:24
99.7 (1) 81:24